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← YouTube. Kanwal Class... 📞 ▾ ⋮

Unit 17 Second Law of Thermodynamics Physics Class 12:
<https://www.youtube.com/playlist?list=PLx3q9E371ENvlewHkN77jwTFK2bFaJrRY>

*Unit 16 First Law of Thermodynamics Class 12 Physics Sindh Boa... **Read more** 7:30 PM ✓✓

You
English class 12

Or isk alawa? 7:30 PM

JazakAllah sir
Apk lectures bht helpful Hain
Google gimini pr b best teachers k
lectures m srf apka name aarha h
7:31 PM



Alhumdulillah bht acha smjh aarha
ap s motivation b milrh or English m
interest bH aarha
Edited 7:32 PM

Thanks a lot sir 7:32 PM

Apka smjhne ka Andaz bht alg h blkl
hr word ko bht ache s smjhaya h wh
b free m Allah Pak apko Jaza e Khair
ata frmaye aameen
7:35 PM

📎 Message 📎 📷 📞

← YouTube. Kanwal Class... 📞 ▾ ⋮

interest bH aarha
Edited 7:32 PM

Thanks a lot sir 7:32 PM

Apka smjhne ka Andaz bht alg h blkl
hr word ko bht ache s smjhaya h wh
b free m Allah Pak apko Jaza e Khair
ata frmaye aameen
7:35 PM

YouTube. Kanwal Class 12 Karachi
Or isk alawa?

Usky elawa nhi hn aur tu. 7:37 PM ✓✓

Ye do subjects hn chemistry start
kron ga kuch time m ..
Tb tk pass kar chuky hngy class.
7:37 PM ✓✓

You
Usky elawa nhi hn aur tu.

Ap chemistry, or maths k lectures
upload kren plz apka jistrh method
hai fori smjh aajayega wese b 12 k
chemistry bht difficult h Kisi k smjh
nai aati
7:38 PM

You
Ye do subjects hn chemistry start kron ga
kuch time m ..
Tb tk pass kar chuky hngy class.

Mtlb hmare prhne k bd ap chemistry
k lectures start krnege?
Edited 7:39 PM

📎 Message 📎 📷 📞

10:52 PM X •

VoLTE 4G 367 K/s 25%

←  YouTube. Kanwal Class...   

Baqi naseeb ki bat hy. 7:41 PM ✓✓

You

Mtlb start krn aur jb tk complete kron .. tb tk ye apki wali batch pass hojai gi. Meri khayal s

Sir English to wese b Kuch time tk complete hojayeg ap jldi jldi English khtm krk chemistry start krwaden sch m Kisi or ka smjh nai aata itne apk lectures k use to hogaye Hain

7:42 PM

You

Mn koshish kron ga ..
Baqi naseeb ki bat hy.

Ap confirm kren to hm chemistry pack krk rkh dain phr apk lectures upload hon jb aps direct prhen

7:42 PM

Dsre sir ka prhane ka Andaz ap s blkl b nai milta apk lectures n bht asani peda kr di h

7:43 PM

Apk physical classe Kahan Hain ?

7:43 PM

YouTube. Kanwal Class 12 Karachi

Apk physical classe Kahan Hain ?

Sukkur, Sindh.

7:45 PM ✓✓

Ap chemistry ka arrange krdain plz



Message



10:54 PM

VoLTE 4G 476 K/s 25%



+92 [REDACTED]



September 17, 2025

Messages and calls are end-to-end encrypted. Only people in this chat can read, listen to, or share them. Learn more.

Asslamu walikum 10:22 AM

Sir I'm your student of second year 10:22 AM

Walekum Assalam 9:03 PM ✓✓

+92 307 3127145
Sir I'm your student of second year

MaShaAllah. 9:03 PM ✓✓

September 18, 2025

This message was deleted 8:11 AM

You are best teacher you explain in simple word every concept 8:11 AM

Screenshot ka time diya karein jab koi topic complete karein to 8:12 AM

+92 307 3127145
You are best teacher you explain in simple word every concept

Thankyou 9:55 AM ✓✓



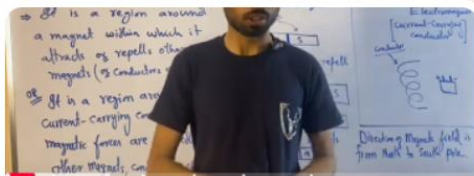
Message



Academy 10:08 AM ✓

Yes sir 10:08 AM

How were they 10:09 AM ✓



Magnetic Field | Unit 18 | Class 12 | Physics | Sindh Baord | XII Lecture 01

1.5K views 11mo ago ...more

AQ Academy 3.93K

72 72 Share Remix Download

Comments 37

Sir lectures daily basis per appload kare please

HOW...? CURRENT-CARRYING CONDUCTOR GENERATE MAGNETIC FIELD

Unit 18 Lec 02

You How were they

Very nice 👍😊 10:10 AM

Thankyou ❤️ 10:10 AM ✓

You're welcome 10:10 AM

Where are you from?

Message



10:53 PM X •

📶 4G 267 K/s 🔋 25%

← YouTube. Kanwal Class... 📞 ⋮

Ap confirm kren to hm chemistry pack krk rkx dain phr apk lectures upload hon jb aps direct prhen

Confirm nhi kr skta abhi tu. Wese .

Mn English pori kron fr bata sakon ga. 7:46 PM ✓

Phr kia kren abh chemistry ka 7:47 PM

Koi or teacher bta dain name 7:47 PM

Abh filhal 7:47 PM

Jo blkl apk trf prhate hon 7:47 PM

YouTube. Kanwal Class 12 Karachi Koi or teacher bta dain name

Sir Naseem Zulfiqar is best. 7:48 PM ✓

Wh to ache Hain pr unka b apk smjhne k bd naai aarha smjh 7:48 PM

Pk lectures itna aadi bna lia h 7:48 PM

Itne addict hogaye Hain apk lectures k 1 mAh m ek chapter krte th wh b bedili s abh 3 dn m 3sra chapter h wh b Khush Dili s 7:49 PM

Sir Koshish kie ga jldi start krni ki bht Dua lgegi 7:49 PM

Message



10:55 PM X

VoLTE 4G 431 K/s 25%



+92



bas wo asaan smjhai topic ko us sy prhn

1:05 PM ✓✓

Today

You

bas wo asaan smjhai topic ko us sy prhn

Sir

11:23 AM

Magnetic fields ja screenshot khapan all chapter

11:24 AM

Sir tawa Jo teaching style tamam behtreen Aa mashallah

11:24 AM

Allah talal tawa khe wadik taraki de

11:25 AM

Please screenshot send kajo note likhandum 15,1617, ja notes prepared Kya athum

11:26 AM

Sir...

3:54 PM

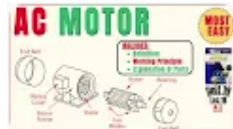
1.

 @shaheenscraft7273 • 10 hours ago **228** subscribers

Finally after watching this video I have understand this topic. Thankyou!

Reply 1 reply ^

👍 🗨️ ❤️ ⋮



Lec18 P1 | AC Motor |
Definition | Working |
Construction | Primary ...

<https://youtu.be/F9U8K78L0eE>

2.

 @DEENOVERDUNIYA29 • 1 day ago **6** subscribers

Ap nay ach samjhaya but yay bohot boring chapter hay itni mushkli words hay ismay

Reply 1 reply ^

👍 🗨️ ❤️ ⋮



I HAVE A DREAM by Jr.
Martin Luther King Speech
English Lesson class 12 ...

<https://youtu.be/4pGD3p0z8-4>

3.

 @MyForever-r7c • 3 days ago

Very great bhai or sir ❤️ ❤️ 😊

Reply 0 replies v

👍 🗨️ ❤️



How Current carrying
conductor produce magnetic
field |Right Hand Rule ...

<https://youtu.be/Tk7naNrrziA>

4.



@MuskanKhan-x6g • 2 days ago (edited)

Sir apka physics ka parhanay ka Andaz Samaj me ata hai JazakAllah 🌸🌸 please agay walay chapters upload kare Jo last walay Apne nhi kiy 22 kay bad ❤️🌟

Reply

1 reply ^



1



Reversible and Irreversible
Process | Thermodynamics
Physics | Class 12 |Sindh ...

<https://youtu.be/INNrhKrEhsY>

5.



@LakshAhuja-r9s • 3 days ago

Sir grammar portion of mdcat b parhae AP ke mane physics ke magnetic field wale lectures dekhe hain AP bhut acha parhate hain full concept clear ho Raha ha

Reply

1 reply ^



NEW English Book Class 12
Sindh Board || PDF download
|| Full Syllabus Notes ...

https://youtu.be/MGVMcj_RRtE

6.



@Baloch_Baloch-o1w • 4 days ago

4.42K subscribers

Good video sir

Reply

0 replies v



Measurement of Magnetic
Flux Density by Current
Balance Class 12 Physics

<https://youtu.be/tJirwSrpS9A>

7.



@afnanadeel5794 • 4 days ago

Very nice work bro ...for specially for reversible and irreversible process .mean w1 w2

Reply

1 reply ^



Increase in Entropy means degradation of Energy, Unit 17 Class 12 Physics Sindh ...

<https://youtu.be/xA0f2mddLJk>

8.



@SafdarAli-n1y3g • 4 days ago

Sir lecture upload karein please

Reply

2 replies ^



@SafdarAli-n1y3g • 2 days ago

@aqacademy1sir ap buht acha padhate hain ap lectures log dekhein gy but time lagega maini Apne friends apki lectures share kye hai wo ap lectures dekhte hai ab



Lec3|How PN Junction is formed? & How Electrons & Holes pass across it?...

<https://youtu.be/i2P61NJgwks>

9.



@MehndiDesigns79 • 7 days ago 3K subscribers

Well explained ❤️

Thankyou..

Reply

0 replies v



The Devoted Friend | QUESTIONS & ANSWERS | MCQs | Exercise | Oscar ...

<https://youtu.be/jtNniSYoVVM>

10.



@Zpubg90 • 6 days ago 1 subscribers

best lecture ever on youtube

Reply

1 reply ^



Increase in Entropy means degradation of Energy, Unit 17 Class 12 Physics Sindh ...

<https://youtu.be/xA0f2mddLJk>

11.



@myartistic_aura • 6 days ago 819 subscribers

Amzing lectures pora book wala sara clear hojata he. kafi waqt bad aesa Vip channel mila he. kafi or bhi vidios hen youtube par dosre creatorts ki ,par ap har bat ko simply and detail se batae hen . keep it up your way of stuyding is perfect ,par thori speed barhaye mein ap ko 1.25 speed par dekhti do wese ap thora slow hen

Reply

1 reply ^



@aqacademy1 • 6 days ago 3.94K subscribers

I teach slow.

Because if any students is slow learner as he can catch me easily.

And of any one is fast learner like you, then students can increase the video speed etc.



Lecture 05 First Law of Thermodynamics
 $\Delta Q = \Delta U + \Delta W$ and Sign ...

https://youtu.be/HE0o9B8ZS_s

12.

 @hamailshaikh • 6 days ago
Mashallah sir bohot acha pharatha hn ap

Reply 1 reply ^

 @aqacademy1 • 6 days ago 3.94K subscribers
Must watch all lectures!



Magnetic Field | Unit 18 |
Class 12 | Physics | Sindh
Baord | XII Lecture 01

<https://youtu.be/IKYDc3UvCwk>

13.

 @MoomalParmar-i7l7t • 9 days ago
Very nice lecture . may god bless you ❤️ ❤️ ❤️ ❤️ ❤️ ❤️ ❤️ ❤️ ❤️ ❤️ 🙏 🙏 🙏

Reply 1 reply ^



Lecture 01 Unit 16 History of
Heat Energy Class 12
Physics Sindh Board

<https://youtu.be/XsAzNYr2ku4>

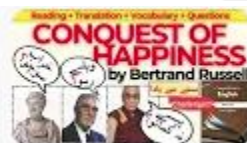
14.

 @AshokKumar-bj4oc • 8 days ago 1 subscribers
Sir is ke words and synonyms with meaning kha mile ge
Sir ap bohat achi learning karweta ho

Reply 1 reply ^

 @aqacademy1 • 7 days ago 3.94K subscribers
Thankyou. For notes contact on 03008311037



Conquest of Happiness by
Bertrand Russel | FULL
EXPLANATION + ...

<https://youtu.be/Y90I8BJZIs>

15.



@AmazonSmart-u7p • 10 days ago

🙏 Thanks ❤️ you really teaches us very well as we need but I need word meaning of this chapter (devoted friend) kindly share the link of the website where u shared if u did not share on any website then plz help me and provide us

Reply

6 replies ^



The Devoted Friend by Oscar Wilde |TRANSLATION + Notes | English Class 12 ...

<https://youtu.be/N-4OcVMdJP0>

16.



@WhoisAb-j8u • 10 days ago

What a nice way of teaching hats off sir u donot have proper setup but still , i am in debt to you , jazakallah kahir

Reply

1 reply ^



Chapter 3 Dynamics | Topic 6 | Law of conservation of linear momentum for two ...

<https://youtu.be/HSaPepCCrpk>

17.



@RamzanTagar-v6p • 12 days ago

Sir or bhi new book ke sary lactur ki video banae

Reply

1 reply ^



18.



@RamzanTagar-v6p • 12 days ago

Sir or bhi new book ke sary lactur ki video banae

Reply

1 reply ^



The Devoted Friend by Oscar Wilde |TRANSLATION + Notes | English Class 12 ...

<https://youtu.be/N-4OcVMdJP0>

19.



@arshadeng64 • 12 days ago

Excellent explanation.

Reply

1 reply ^



Magnetic Flux Density class
12 | Definition | Formula |
Unit Derivation | AQ Academy

<https://youtu.be/fnfv2tonpq0>

20.



@DEENOVERDUNIYA29 • 4 days ago 6 subscribers

Such a great leacture I have never understood this so well in my entire life 🤔🤔🤔

Reply

1 reply ^



The Devoted Friend by Oscar
Wilde | TRANSLATION +
Notes | English Class 12 ...

<https://youtu.be/N-4OcVMdJP0>

21.



@Itsraozaadi • 13 days ago 8 subscribers

good job, Ma Sha Allah.....!!!

Reply

1 reply ^



@SamiullahKhan-r6u • 12 days ago

Thank you so much sir 😊😊😊

Reply

1 reply ^



1



I HAVE A DREAM by Jr.
Martin Luther King Speech
English Lesson class 12 ...

<https://youtu.be/4pGD3p0z8-4>

22.



@DilmuradMangrio-w8b • 6 days ago 1 subscribers



Reply

0 replies ▾



NOVEL: Great Expectations
by Charles Dickens|English
Class 12 Sindh Board | by A...



@DilmuradMangrio-w8b • 6 days ago 1 subscribers

Sir apka samghani ka tareka baht easy Hy

Reply

1 reply ^



<https://youtu.be/WoOkq04JQd0>

23.



@Saqibnabi018 • 3 weeks ago 185 subscribers

"🌟 MashaAllah, your teaching style is truly amazing! 🌟🌟 Don't lose hope because of low views 👁️ and subscribers 👤 – every big YouTuber once started small. 🌟 InshaAllah, one day you'll be among the best teachers 🌟 and biggest YouTubers 🌍🌟. Keep inspiring us! 🙌🔥"



THE DAY THE DAM BROKE
by James Groves Thurber
Chapter 6 class 12 NEW ...

https://youtu.be/2u_vl9fLkaU

24.



@UzmaShahani-f2h • 3 weeks ago

sir Ap ka way of teaching bhot acha ha samja bhi ata ha. lots of thankx sir .

Reply

0 replies ▾



Solved MCQs Of Unit 18
Magnetic Field || Class 12
Physics || MDCAT || AQ ...

https://youtu.be/cToQE3_9O40

25.



@SarfrazJan-v7i • 12 days ago

Sir first year physics ke lecture chapter 8

Reply

1 reply ^



@aqacademy1 • 11 days ago (edited)

InshaAllah



NOVEL: Great Expectations
by Charles Dickens|English
Class 12 Sindh Board | by A...

<https://youtu.be/WoOkq04JQd0>

26.

@RamzanTagar-v6p • 13 days ago

Sir or bhi new book ke sary lactur ki video banae

Reply

1 reply ^



@aqacademy1 • 11 days ago

Already uploaded.

Reply



1



The Devoted Friend by Oscar
Wilde |TRANSLATION +
Notes | English Class 12 ...

<https://youtu.be/N-4OcVMdJP0>

27.28.29



@KiranMemon-ib6yi • 2 weeks ago



Reply

0 replies ▾



Diesel Engine | Working & Construction | Class 12 | Physics | Sindh Board | AO



@SamiullahKhan-r6u • 2 weeks ago



Reply

0 replies ▾



1



Icarus & Daedalus written by Josephine Preston Peabody || Reading & Translation | A



@studyzone-01-yt • 2 weeks ago

Amazing way 🙌

Reply

1 reply ^



Petrol Engine | Working & Construction | Otto Cycle | Class 12 Physics | Sindh ...

<https://youtu.be/tkxViJ9a7nY>

Diesel Engine Lecture

https://youtu.be/tvc_CeCKYLY

Icarus & Daedalus

<https://youtu.be/-vSTpGdS3Lq>

Petrol Engine

30.



@Itsraozaadi • 2 weeks ago 8 subscribers

good job, Ma Sha Allah.....!!!

Reply

1 reply ^



@aqacademy1 • 11 days ago 3.95K subscribers

Thankyou.



I HAVE A DREAM by Jr. Martin Luther King Speech English Lesson class 12 ...

<https://youtu.be/4pGD3p0z8-4>

31.



@DEENOVERDUNIYA29 • 5 days ago 6 subscribers

Such a great leacture I have never understood this so well in my entire life 😊😊😊

Reply

1 reply ^



@aqacademy1 • 5 days ago 3.95K subscribers

Thankyou.



The Devoted Friend by Oscar Wilde |TRANSLATION + Notes | English Class 12 ...

<https://youtu.be/N-4OcVMdJP0>

32.



@DilmuradMangrio-w8b • 7 days ago 1 subscribers

Sir apka samghani ka tareka baht easy Hy

Reply

1 reply ^



@aqacademy1 • 7 days ago 3.95K subscribers

Thankyou.



NOVEL: Great Expectations by Charles Dickens|English Class 12 Sindh Board | by A...

<https://youtu.be/7pzSbn BDcQ>

33.



@AliMardan-c8p • 2 weeks ago

Knowledgeable and easy way to understand. Physics so good

Reply

1 reply ^



Reversible and Irreversible
Process | Thermodynamics
Physics | Class 12 | Sindh ...

<https://youtu.be/INNrhkrEhsY>

34.

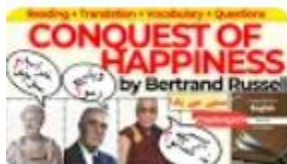


@SMFACADEMY-z2i • 2 weeks ago

sir pst bhi parhaen detail main

Reply

0 replies v



Conquest of Happiness by
Bertrand Russell | FULL
EXPLANATION + ...

<https://youtu.be/Y90l18BJZls>

35.



@Itsraozaadi • 3 weeks ago 8 subscribers

u did such an amazing work.....!!! I really appreciate it, Keep it up!!

Reply

1 reply ^



The Devoted Friend by Oscar
Wilde | TRANSLATION +
Notes | English Class 12 ...

<https://youtu.be/N-4OcVMdJP0>

36.



@Syedmuhammadali515  • 3 weeks ago **158** subscribers

So sweet lecture

Reply

0 replies ▾



1



Keep watching

Thanks for liking

So nice



@Syedmuhammadali515  • 3 weeks ago **158** subscribers

Or sir AP topic ki shat bola karen ki ya mcqs point hn mote karo

Reply

0 replies ▾



1



Temperature | Thermal
Equilibrium | Scales of
Temperature | Chapter 15

<https://youtu.be/yVK9cF390IA>

37.

 @lqra-y3o1e • 3 weeks ago 2 subscribers
❤️ ❤️ ❤️

Reply 0 replies ▾

👍 🗨️

 @Syedmuhammadali515 📺 • 3 weeks ago 158 subscribers
😊😊😊😊😊😊😊😊

Reply 0 replies ▾

👍 1 🗨️

 @Syedmuhammadali515 📺 • 3 weeks ago 158 subscribers
Sir AP ki lecture mein hard work hn so sweet

Reply 1 reply ^

👍 1 🗨️

<https://youtu.be/2KJuS0EU47g>

38.

 @AliAli-iv4mp • 3 weeks ago
Nice lecture so sweet

Reply 1 reply ^

👍 1 🗨️

 @AliAli-iv4mp • 3 weeks ago
😊😊😊😊😊😊❤️❤️ nice

Reply 1 reply ^

👍 1 🗨️



https://youtu.be/j_hnK3YeKPY

39.



@Saqibnabi018 • 3 weeks ago 185 subscribers

"☀️ MashaAllah, your teaching style is truly amazing! 📖✨ Don't lose hope because of low views 👁️ and subscribers — every big YouTuber once started small. 🚀 InshaAllah, one day you'll be among the best teachers 🧑🏫 and biggest YouTubers 🌍🔥. Keep inspiring us! 🙌🔥"



THE DAY THE DAM BROKE
by James Groves Thurber
Chapter 6 class 12 NEW ...

https://youtu.be/2u_vl9fLkaU

40.



@nusratalimemon6268 • 3 weeks ago 410 subscribers

Zindabad

Reply

0 replies ▾



Kinetic Molecular Theory of
gases | KMT theory of gases
Class 12 Physics |Lecture 6

<https://youtu.be/RWzsWj1rIXo>

41.



@AsifAliBaloch-e4t4d • 3 weeks ago

A lot of thanks sir ❤️❤️❤️

Reply

1 reply ^



CLIMATE CHANGE: its
causes and effects Class 12
New English Sindh Board ...

<https://youtu.be/mVVf5ewJwsQ>

42.



@SamiLakho-uf7yh • 3 weeks ago

Great explanation 😊

Reply

1 reply ^



How Current carrying conductor produce magnetic field | Right Hand Rule ...

<https://youtu.be/Tk7naNrrziA>

43.



@UzmaShahani-f2h • 3 weeks ago

sir Ap ka way of teaching bhot acha ha samja bhi ata ha. lots of thankx sir .

Reply

0 replies v



Solved MCQs Of Unit 18 Magnetic Field || Class 12 Physics || MDCAT || AQ ...

https://youtu.be/cToQE3_9O40

44.



@MusmanJatoi • 3 weeks ago

Best lecture help full THANK YOU SIR 😊

Reply

0 replies v



Petrol Engine | Working & Construction | Otto Cycle | Class 12 Physics | Sindh ...

<https://youtu.be/-vSTpGdS3Lg>

45.

 @PartabLakhani-i1m • 3 weeks ago 8 subscribers
Sir Great lecture ❤️ ❤️ ❤️ ❤️

Reply 1 reply ^

👍 🗨️





The Devoted Friend by Oscar Wilde |TRANSLATION + Notes | English Class 12 ...

<https://youtu.be/N-4OcVMdJP0>

46.

 @MusmanJatoi • 3 weeks ago
Best lecture 😊

Reply 1 reply ^

👍 🗨️





Working Substance of Heat Engine | Efficiency of Heat Engine | Class 12 Physics ...

<https://youtu.be/3jWENSGIolw>

47.

@KiranMemon-ib6yi • 2 weeks ago

I really appreciate you sir the way you explain everything is great thanks alot ❤️

Reply

1 reply ^



Reversible and Irreversible
Process | Thermodynamics
Physics | Class 12 | Sindh ...

<https://youtu.be/INNrhKrEhsY>

48.



@QueenBabakipari • 4 weeks ago

Allah gives you every things specially success in your life amazing lecture ❤️

Reply

1 reply ^



I HAVE A DREAM by Jr.
Martin Luther King Speech
English Lesson class 12 ...

<https://youtu.be/4pGD3p0z8-4>

49.



@murksamoo6873 • 4 weeks ago

You did explain very well

Reply

1 reply ^



Lecture 01 Unit 16 History of
Heat Energy Class 12
Physics Sindh Board

<https://youtu.be/XsAzNYr2ku4>

50.



@ShanAli-le9he • 4 weeks ago

Great work ✨

Also sir I want to say that please don't stop just because of you're not getting views, no matter you get 10+ views in 5+hours.. just keep going, don't stop please I request you.. if you help at least one student... That's alot.. don't stop teaching online please. I really appreciate your work.. one day you will rise. Consistency is the key.. 🏆 ✨

Reply

1 reply ^



@aqacademy1 • 4 weeks ago 3.95K subscribers

Thankyou Shan!! With this motivation AQ academy is giving its services without any profit!

Would be thankful if you recommend our channel to your friends and fellows



THE DAY THE DAM BROKE
by James Groves Thurber
Chapter 6 class 12 NEW ...

https://youtu.be/2u_vl9fLkaU

51.

 @nidakha3237 • 4 weeks ago **3 subscribers**

Sir grammars part b is ka send krden
Catpohric or anaphoric wala

Reply 4 replies ^   

 @nidakha3237 • 4 weeks ago **3 subscribers**

Sir kb bht intizar h grammar part sub ny literature py sir Dua grammar koi ni samjha raha agar ap Kal tk upload karden 17 say 30 tk ka pages ka Kam samjha Dy to bht acha hoga sir

Reply     



The Devoted Friend by Oscar Wilde |TRANSLATION + Notes | English Class 12 ...

<https://youtu.be/N-4OcVMdJP0>

52.

 @QueenBabakipari • 4 weeks ago

Sir Sara unit upload Kara

Reply 1 reply ^   



@aqacademy1 • 4 weeks ago **3.95K subscribers**

G uploaded hn sary units.



I HAVE A DREAM by Jr. Martin Luther King Speech English Lesson class 12 ...

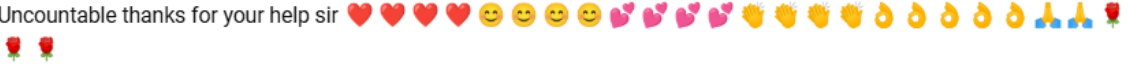
<https://youtu.be/4pGD3p0z8-4>

53.

D

@DewanMaharaj  • 1 month ago

Uncountable thanks for your help sir



Reply

1 reply ^



D

@DewanMaharaj  • 4 weeks ago

Thank you so much sir god bless you



Reply

1 reply ^



@DewanMaharaj  • 1 month ago

Thanks sir 😊🌹🌹💕💕💕 you are very hard worker ❤️❤️❤️

Reply

2 replies ^



How much Land does a man
need || Reading,
TRANSLATION and FULL ...

<https://youtu.be/aoBARh7vHcE>

54.



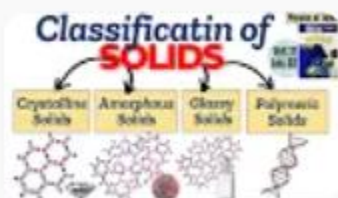
@MuhammadWaqas-y3e9s • 1 month ago

sir u r legend



Reply

1 reply ^



Lec2|Classification of Solids

|Crystalline Solids

|Amorphous Solids |Glassy ...

[https://youtu.be/dqKzpk-](https://youtu.be/dqKzpk-PZxg)

[PZxg](https://youtu.be/dqKzpk-PZxg)

55.



@SyedaTayyaba-x6n • 1 month ago

Here for my revision YOUR LECTURES ARE BEST THANKYOUUU ❤️

Reply

1 reply ^



Magnetic Field | Unit 18 |

Class 12 | Physics | Sindh

Baord | XII Lecture 01

<https://youtu.be/lKYDc3UvCwk>

56.



@ZainabEducation1 • 1 month ago

thank you app ka boht boht aap jaise video poore youtube pe nhi hai

Reply

1 reply ^



The Devoted Friend by Oscar Wilde |TRANSLATION + Notes | English Class 12 ...

[https://youtu.be/N-](https://youtu.be/N-4OcVMdJP0)

[4OcVMdJP0](https://youtu.be/N-4OcVMdJP0)

57.



@DewanMaharaj • 1 month ago

Wa sir Kya Andaz hai ❤️🔥😄💕💕 thank you

Reply

3 replies ^



@aqacademy1

• 1 month ago

3.95K subscribers

Physics apki favorite hojai gi agar ap continuously lectures dekhni gy! InShaAllah!!



Magnetic Field | Unit 18 |
Class 12 | Physics | Sindh
Baord | XII Lecture 01

<https://youtu.be/IKYDc3UvCwk>

58.

@MuskanTalpur-f6w • 1 month ago

Thanks sir for my concept clear after see you lectures my books concept is very clear 😊
I'm confident about my books concept I got full information from books

Reply

1 reply ^

👍 2



@aqacademy1

• 1 month ago

3.95K subscribers

InShaAllah physics would be your favourite subject after completion of course



Chapter 2 Topic 30 Projectile
Motion of in x-axis and y-axis

<https://youtu.be/iVG654i5X6E>

59.



@DewanMaharaj • 1 month ago

Thank you so much sir ❤️❤️❤️❤️❤️❤️❤️❤️❤️❤️❤️❤️❤️❤️❤️❤️ unit 5 plz sir and
plz start novel part



Icarus & Daedalus written by
Josephine Preston Peabody
|| QUESTIONS & ANSWERS ...

[Icarus & Daedalus](#)

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60.

SAMPLE OF NOTES BY AQ ACADEMY

For full notes you can contact on 0300-8311037 or visit our academy at **Sukkur**.
Here I have pasted three four pages of each chapter for you understanding

Must go through both Class 12 and Class 11 Notes of Physics & English.

Chapterwise easy and difficult test quiz

AQ Academy Khairpur

Contact: 03008311037

By: Sir Abdul Qayoom Mangrio

CHAPTER 2

ELECTROSTATICS

PHYSICS-XII

CHAPTER WISE TEST-2

MOST OF THE MCQS BELOW ARE REPEATED AND APPEARED IN MDCAT & ENGINEERING ENTRY TESTS

- Mechanical Work is written as ____, thermodynamic work is written as ____, and electrical work is written as ____.
a) $W=F.d$, $W=q.V$, $W=p.V$ b) $W=F.d$, $\Delta W=P.\Delta V$, $W=q.V$ c) $W=q.V$, $W=F.d$, $W=P.V$
- The force on a charge is given by ____, the force on the mass is by ____, the force on the on the charge with radius r is given by ____.
a) $F=qE$, $F=ma$, $F=Kq/r^2$ b) $F=ma$, $F=qE$, $F=Kq/r^2$ c) $F=Kq/r^2$, $F=ma$, $F=kq/r^2$
- Electric Flux per unit area $[\Phi/A]$ is ____, the charge per unit area $[q/A]$ is ____.
a) Charge density, flux density b) Flux Density, Charge density c) mass density, charge density
- The change in potential energy per unit charge Between two points in an electric field is called: [Hint: $P.E=Work$]
A) Intensity b) Flux c) Potential difference d) Permittivity
- If the potential at a point which is 1m from a charge is 1 volt, then the potential at A point which is 2m from the same charge will be:
a) 2V b) 1V c) 0.5V d) 3V
- Potential difference V is ----- proportional to r (distance), so by increasing the r distance V will be _____.
a) Directly, increase b) Directly, decrease c) Inversely, Decrease d) Inversely, increase
- The values of electric intensity ----- due to the presence of dielectric medium:
a) Increase b) Decrease c) Increase exponential d) Remain Same
- The Value of capacitance of capacitor ----- due to the presence of dielectric medium.
a) Increase b) Decrease c) Increase exponential d) Remain Same
- The dielectric medium between plates must be _____.
a) Conductor b) Insulator c) a & b d) None
- In capacitors, energy is stored in the form of:
a) Gravitational energy b) Kinetic energy c) Electric Field d) Magnetic induction
- Ohm time's farad is equivalent to: [hint: $RC=t$]
a) Time b) Charge c) Distance d) Capacitor
- A capacitor is charged with a battery and energy stored is U . After disconnecting battery Another capacitor of same capacity is connected in parallel to the first capacitor. Then Energy stored in each capacitor is:
a) $U/2$ b) $U/4$ c) $4U$ d) $2U$
- What is the potential difference between two points in an electric field if it takes 600 J of Energy to move a charge of 2 C between these two points?
a) 0 J b) 1200 J c) 300 J d) 800 J
- Gauss law cannot be used to find which of the following quantity?
a) Electric field intensity b) Electric flux density c) Charge d) Permittivity
- Which one of the following statements is true?
a) electrostatic force obeys inverse square law while gravitational force does not.
b) both gravitational force and electrostatic force are repulsive in nature
c) gravitational force is much weaker than electrostatic force
d) Both electrostatic force and gravitational force don't obey inverse square law
- The coulomb's constant k depends upon: [Hint: System of units means $k=1/4\pi\epsilon_0$]
a) nature of medium b) system of units c) types of charge d) nature of medium and system of units
- A charged particle is moving in a uniform electric field. For the motion of the particle due to the field, which quantity has a constant non-zero value?
a) Acceleration b) displacement c) rate of change of acceleration d) velocity
- A capacitor of capacitance ' C ' has a charge ' Q ' and stored energy is ' W '. if the charge is increased to $2Q$, the stored energy would be: [Hint: Energy stored in capacitor: $Q^2/2C$]
a) $W/4$ b) $2xW$ c) $4xW$ d) $W/4$
- Decrease the separation of two positive charges by one half will cause electro static force of repulsion to change by:
a) 4 times b) 2 times c) $1/2$ times d) $1/4$ times
- Two capacitors of $3\mu F$ and $6\mu F$ are connected in series, their equivalent capacitance is:
a) $9\mu F$ b) $3\mu F$ c) $1/2\mu F$ d) $2\mu F$
- If electrostatic force of two electrons at a distance is " F Newton", the electrostatic force of two Protons at the same distance in Newton is:
a) Zero b) $F/2$ c) F d) $2F$
- The relation $\Delta V/\Delta r$ represent:

- a) Gauss' law b) Electric Flux c) Potential gradient d) Potential Difference
23. Capacitor of $5\mu\text{F}$ and $7\mu\text{F}$ are connected in parallel, their equivalent capacitance is
a) $0.12\mu\text{F}$ b) $12\mu\text{F}$ c) $0.34\mu\text{F}$ d) $2.9\mu\text{F}$
24. Joule per coulomb is called:
a) Farad b) Gauss c) Ampere d) Volt
25. The minimum electron charge possible in Isolated form is :
a) 1.6×10^{-19} coulomb b) 1×10^{12} coulomb c) 1×10^{-6} coulomb d) 1 coulomb
26. The net force on a proton placed between two Parallel plates of having equal positive charge is:
a) σ/ϵ_0 b) $2\sigma/\epsilon_0$ c) $\sigma/2\epsilon_0$ d) Zero
27. A dielectric $k=2$ is inserted between the plates of a $20\mu\text{F}$ capacitor. Its capacitance is:
a) $10\mu\text{F}$ b) $18\mu\text{F}$ c) $22\mu\text{F}$ d) $40\mu\text{F}$
28. The concept of electric lines of forces was Introduced by:
a) Newton b) Einstein c) Coulomb d) Faraday
29. Coulomb per volt is the unit of:
a) Resistance b) Current c) Voltage d) Capacitance
30. Coulomb per second is the unit of:
a) Resistance b) Current c) Voltage d) Capacitance
31. Joule per coulomb is the unit of:
a) Resistance b) Current c) Voltage d) Capacitance
32. The force per unit charge is:
a) Electric flux b) Electric field intensity c) Electric potential d) Electric current
33. The electric flux through a closed surface depends on the:
a) Magnitude of the charge enclosed by the surface b) The shape of the surface.
c) Position of the charge enclosed by the surface d) None of the above.
34. Electron volt is the unit of:
a) Energy b) Force c) Potential difference d) Current
35. When a dielectric is placed in electric field, it becomes:
a) Negative charge only b) Positive charge only c) Polarized d) Conductive.
36. The earth surface is considered to be at
a) Zero potential b) Positive potential c) Negative potential d) Infinite potential
37. When a dielectric is inserted between the plates of a parallel plate capacitor the potential difference is
a) Increased b) Decreased c) Remain same d) Become zero
38. The value of permittivity of free space in units ($\text{C}^2/\text{N.m}^2$).
a) 8.86×10^{-11} b) $8.86 \times 10^{8.86} \times 10^{-12}$ c) 1.6×10^{-19} d) 9×10^9
39. The electric field between two electrons separated by a distance r varies as
a) r b) r^2 c) $\frac{1}{r_1 r_2}$ d) $1/r$
40. Which of the following is a vector quantity?
a) Electric Flux b) Electric Potential difference c) Electric Field Intensity d) Electric Charge
41. One electron volt is equal to:
a) 1.6×10^{-11} joule b) 1.6×10^{-19} Joule c) 1.6×10^{-19} volt d) 1.6×10^{-19} coulomb
42. The force on a charge particle "q" in electric field intensity "E" is given by
a) E/qk b) q/E c) qE d) None
43. A free electron in an electric field
a) Remains stationary b) Moves from higher potential to lower potential
c) Moves from lower potential to higher potential d) It can move in any direction
44. Magnitude of an electric field does not depend on
a) Nature of charge particle b) Distance from charge particle c) Magnitude of charge particle d) None
45. The electric potential is zero:
a) Midway between any two charges of the opposite signs b) Inside a conductor
c) Midway between two equal charges of the same d) At ends of conductor
46. If the electric field is perpendicular to the surface, then electric flux will be
a) Minimum b) Zero c) Maximum d) Negative
47. The capacitance of parallel plate depends on
a) Thickness of the capacitor plates b) Charge on plates
c) Potential difference across the plates d) Geometry of the capacitor
48. Two charges of 1coulomb each are placed 1m apart in free space. The force acting between them is
a) 1N b) 9×10^9 c) 8.85×10^{-12} N d) 6.25×10^{18} N

49. Two charges of 1 coulomb each are placed 1m apart in free space. The force acting between them is
 a) ϵ_0 b) K c) π d) N_A
50. An electron of charge 'e' is accelerated by applying potential difference ' ΔV ', the electron acquires energy
 a) ΔV b) $\Delta V \times e$ c) $\Delta V/e$ d) $e / \Delta V$
51. The potential difference on equipotential surface is
 a) Infinite b) Zero c) Maximum d) Minimum
52. Capacitance of a parallel plate capacitor does not depend upon
 a) Nature of material of the plates b) Dielectric Medium c) Area of the plates d) Separation between the plates
53. When an electron is accelerated through a potential difference of one Volt then electron acquires energy
 a) 1 J b) 1 volt c) 1 eV d) 1 Erg
54. On equipotential surface, work done in moving charge particle
 a) Positive b) Negative c) Zero d) Infinity
55. At midpoint between two equal and opposite charges:
 a) Only V is zero b) V as well as E is zero c) Only E is zero d) Neither V nor E is zero
56. Electric field intensity (E) at center of uniformly charged sphere is
 a) zero b) non-zero c) can be both d) none
57. Potential difference at center of uniformly charged sphere is
 a) Zero b) non-zero c) can be both d) none
58. Two equal charges each of one coulomb are held 1 m apart in free space exert a force of Magnitude:
 a. One newton b. 9×10^9 N c. 8.85×10^{-12} N d. 6.67×10^{-11} N
59. Three capacitors of 3 μ F each are connected in series the equivalent capacitance of the circuit is:
 a. 1 μ F b. 3 μ F c. 6 μ F d. 9 μ F
60. The electric field intensity between two similarly charged parallel plates is ___ and two oppositely charged plates is ____.
 a) $E = \sigma/\epsilon$, $E = \sigma/\epsilon$ b) $E = \sigma/\epsilon$, $E = \sigma/2\epsilon$ c) $E = 2\sigma/\epsilon$, $E = \sigma/\epsilon$ d) None
61. The capacitance of a parallel plate capacitor does not depend on:
 a. Area of plates b. Nature of plates c. Distance between the plates d. Medium between the plates
62. If a charged body moved against the electric field, It would gain:
 a. Kinetic energy b. Mechanical energy c. Gravitational potential energy d. Electric P.E
63. Electric flux is a:
 a. Scalar quantity b. Vector quantity c. Fundamental quantity d. None of these
64. Presence of dielectric always:
 a. Increase the electrostatic force b. Reduce the electrostatic force c. Do not affect electrostatic force d. Doubles the electrostatic force.
65. When the medium is insulator the electric force between the charge is
 a. Decreased b. Increased c. Zero d. Infinity
66. The electric field created by positive charge is:
 a. Circular b. Radially outward c. Radially inward d) Zero
67. The electric field created by negative charge is:
 a. Circular b. Radially outward c. Radially inward d) Zero
68. The Electric flux through a surface is maximum if angle between E and A is:
 a) 0 degree b) 90 degree c) 45 degree d) 180 degree
69. The value of Electric flux increases as angle _____.
 a) Increase from 0° to 90° b) decrease from 90° to 0° c) equals 90° d) equals to 0°
70. If the distance between two charges is halved and charges are also doubled, then force between them will be:
 a) two times b) four times c) eight times d) sixteen times
71. Coulomb per volt is called:
 a) Farad b) Ampere c) Joule d) Henry
72. Gauss's law can only be applied to
 a) A curved surface b) A flat surface c) A surface of any shape d) A closed surface (of any shape)
73. Two oppositely charged balls A and B attract the third ball C, when placed near they turn by turn. The third ball C must be:
 (a) Positively charged (b) Negatively charged (c) electrically neutral (d) Positively and negatively charged
74. Which material should be inserted between the plates of a capacitor in order to increase its capacitance?
 a) copper b) mica c) iron d) tin
75. The net charge on a capacitor is ___ when each plate having magnitude of charge q (both parallel plate of capacitor has equal charge). [Hint: One plate is charged +q & other -q so +q-q=?]
 a) infinity b) 2 c) q/2 d) zero

76. If electric and gravitational forces on an electron balance each other, then electric intensity will be:
 a) $E = \frac{mg}{q}$ b) $E = \frac{q}{mg}$ c) $E = \frac{F_e}{q}$ d) $E = \frac{1}{4\pi\epsilon_0 r^2}$
77. A charge of 4 Coulomb is in the field of intensity 4 N/C. The force on the charge is:
 a) 8 N b) 16 N c) 4 N d) 1 N
78. A billion electrons are added to pith ball. Its charge is: [Hint: One billion = 1×10^9]
 a) 1.6×10^{-10} C b) 1.6×10^{12} C c) -1.6×10^{-14} C d) -1.6×10^{13}
79. What is the force on a proton placed between two parallel plates containing equal positive charges:
 a) Zero b) 2.6×10^{-19} N c) 9×10^{19} N d) 5×10^{19} N
80. Equation $\phi = E.A$ is applicable to the surface.
 a) cylindrical b) Conical c) Flat d) Spherical
81. Due to polarization, electric field E in a capacitor:
 a) increases b) decreases c) first increases then decrease d) remains same
82. The study of electric charges at rest under the action of electric forces is known as:
 a) Electromagnetism b) Electrostatics c) Magnetic Induction d) Electric field
83. A particle carrying a charge of $2e$ falls through a potential difference of 3V. Find work done (energy) required.
 a) 9.6×10^{-19} J b) 9.6×10^{19} J c) 1.6×10^{-19} J d) 1.6×10^{19} J
84. The force on an electron in a field of 1×10^8 N/C will be:
 a) 1.6×10^{-8} N b) 1.6×10^{-11} N c) 1.6×10^{-9} N d) 1.6×10^{27} N
85. A charge of 10^{-10} C between two parallel plates 1 cm apart experiences a force of 10^{-5} N. The p.d. between the plates is:
 a) 10 V b) 10^2 V c) 10^3 V d) 10^4 V
86. The value of charge on 1.0×10^7 electrons is: [Hint: Number of electrons = $\frac{\text{Given Charge (q)}}{\text{charge of electron (e)}}$] or $[n = q/e]$
 a) 1.6×10^{-12} C b) 1.6×10^{11} C c) 1.6×10^{-19} V d) 1.6×10^{19} C
87. Rubber ball of radius 2cm has charge of 5uC on its surface, which is uniformly distributed the value of E at center is:
 a) 10 NC^{-1} b) Zero c) 2.5 NC^{-1} d) $5 \times 10^2 \text{ NC}^{-1}$
88. The force on electron in an electric field of magnitude 10 N/C is:
 a) 1.9×10^{-16} N b) 1.6×10^{-17} N c) 1.6×10^{-18} N d) 1.6×10^{-19} N
89. The energy stored in the capacitor is:
 a) K.E (Mechanical) b) P.E (Mechanical) c) Electrical K.E d) Electrical P.E
90. A particle of mass m and charge q is released from rest in a uniform electric field. The K.E attained by the particle after moving a distance 'd' is: [Hint: Work = K.E]
 a) Ed/q b) qE^2d c) qEd d) qE/d^2
91. The statement $\phi = \frac{q}{\epsilon}$ was given by:
 a) Farady b) Dersted c) Gauss d) Coulomb
92. The negative sign in the expression of potential gradient $E = -\frac{\Delta V}{\Delta r}$ shows that, direction of E is along.
 a) Increasing potential b) Decreasing potential c) Increasing strength d) Negative potential
93. A capacitor is a device that can:
 a) generate charge b) store charge c) neutralize charge d) burn charge
94. Electric flux through a surface enclosing a charge depends on:
 a) charge only b) medium only c) shape of closed surface d) medium and charge enclosed
95. When a dielectric material is inserted between the plates of a capacitor, the potential difference between the plates:
 a) Does not change b) Increases c) Decreases d) Increases then decreases
96. On removing the dielectric from a charged capacitor its energy:
 (A) Increases b) Remains Unchanged c) Decreases d) None of these
97. On inserting the dielectric in a capacitor then its Capacitance ____, Energy ____, & Potential difference ____.
 a) Increase, Decreases, decreases b) Decreases, Decreases, Increase
 b) Increase, Increases, increases d) Decreases, Increases, Increases
98. On removing the dielectric from a capacitor then its Capacitance ____, Energy ____, & Potential difference ____.
 a) Increase, Decreases, decreases b) Decreases, Decreases, Increase
 b) Increase, Increases, increases d) Decreases, Increases, Increases
99. A parallel plate capacitor with oil between the plate ($\epsilon_r = 2$) has a capacitance C, If the oil is removed then capacitance of capacitor becomes.
 a) C b) C/2 c) $C/\sqrt{2}$ d) $\sqrt{2}C$
100. By increasing area of the plates and decreasing distance between them, the capacitance of capacitor:
 a) Increases b) Decreases c) Remains unchanged d) Depending upon temperature

The End

Key of ELECTROSTATICS (Chapter 2) Physics-XII by AQ Academy Khairpur (Individual Classes)

S.No.	Correct Option	S.No.	Correct Option	S.No.	Correct Option	S.No.	Correct Option	S.No.	Correct Option
1	B	21	C	41	B	61	B	81	A
2	A	22	C	42	C	62	D	82	B
3	B	23	B	43	C	63	A	83	A
4	C	24	D	44	A	64	B	84	B
5	C	25	A	45	C	65	A	85	C
6	C	26	D	46	C	66	B	86	A
7	B	27	D	47	D	67	C	87	B
8	A	28	D	48	B	68	A	88	D
9	B	29	D	49	B	69	A	89	D
10	C	30	B	50	B	70	D	90	C
11	A	31	C	51	B	71	A	91	C
12	B	32	B	52	A	72	D	92	B
13	C	33	A	53	C	73	C	93	B
14	D	34	A	54	C	74	C	94	D
15	C	35	C	55	A	75	D	95	B
16	D	36	A	56	A	76	A	96	C
17	A	37	B	57	A	77	B	97	A
18	C	38	B	58	B	78	A	98	B
19	A	39	C	59	A	79	B	99	B
20	D	40	C	60	A	80	C	100	A

Class 12 Physics notes

Chapter 15: Kinetic Molecular Theory

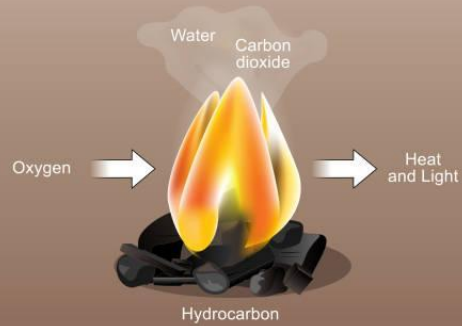
Section (A): Chapter Theory

Lecture 01 <https://youtu.be/TDoQEuupOl8?si=ndB07-LjHpGM0Kdm>

Topic: Difference between Heat Fire Temperature Thermometer

FIRE	Heat (ΔQ)	TEMPERATURE	THERMOMETER
● Chemical Reaction ● Produces light, heat, and flames. ● Source of Thermal Energy ● Fire can be seen	● Form of Energy ● Flows from hotter to colder body ● It changes temp. ● Heat can't be seen ● Measured in: ○ Joules (S.I.) ○ Calories	● Measure of how hot or cold something is. ● It tells how much heat energy is present but does not transfer energy itself. ● It is a measure of energy, not a form of energy. ● Measured in: ○ $^{\circ}\text{C}$, $^{\circ}\text{F}$, ○ K (S.I. unit)	● It is an instrument/device used to measure temperature with a specific value. ○ Liquid-in-glass thermometers ○ Digital thermometers ○ Infrared thermometers
Example: A burning candle or campfire.	Example: When you boil water, the energy that makes the water molecules move faster is heat.	Example: 100°C is the temperature at which water boils.	Example: A thermometer shows your body temperature is 37°C .
Fire is “Chemical Reaction (Combustion)”	Heat is “Energy”	Temperature is “Measurement”	Thermometer is “Instrument”

COMBUSTION REACTION



Heat

The heat **energy** from the stove burner warms up the water.



Temperature

The thermometer **measures** the temperature of the water.

Boiling water =
212°F (100°C)



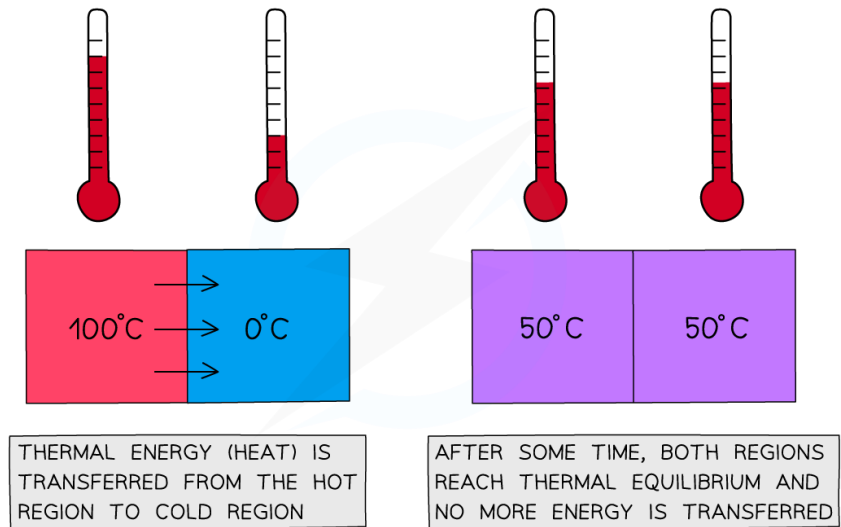
Lecture 02 https://youtu.be/j_hnK3YeKPY?si=Z5VXQyMuRnfE2k2f

Topic:

Temperature: It is a measure of the average translational kinetic energy of the molecules of a body.

Thermal Equilibrium:

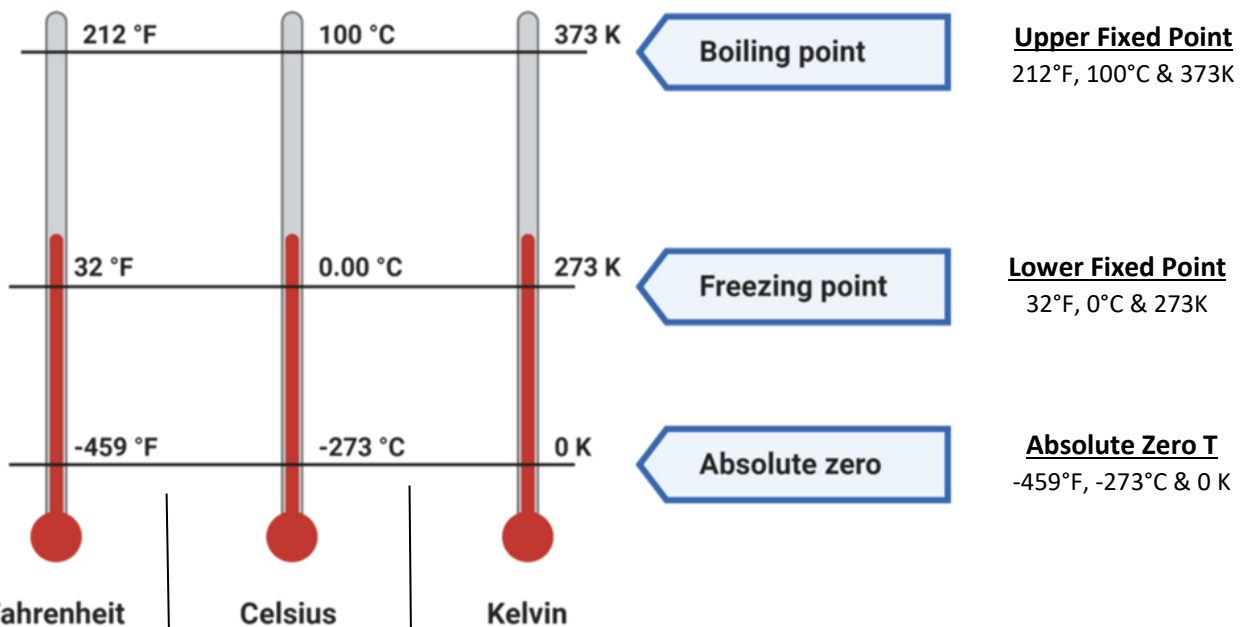
When two bodies at different temperatures are brought in contact with each other, the heat starts flowing from the hot body to the cold body till the temperature of both bodies becomes the same, then they are said to be in Thermal Equilibrium.



Scales of Temperature:

There are three Scales of temperature

- Centigrade or Celsius Scale ($^{\circ}\text{C}$)
- Fahrenheit Scale ($^{\circ}\text{F}$)
- Kelvin or Absolute scale (K)



Divisions:	180	100	100
	(From 32 to 212)	(From 0 to 100)	(From 273 to 373)

One degree of $^{\circ}\text{C}$ and $^{\circ}\text{K}$ is equals to 1.8

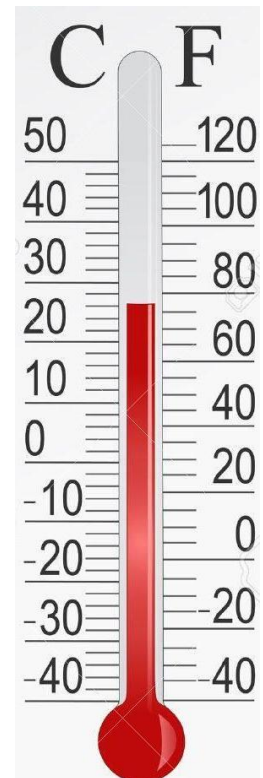
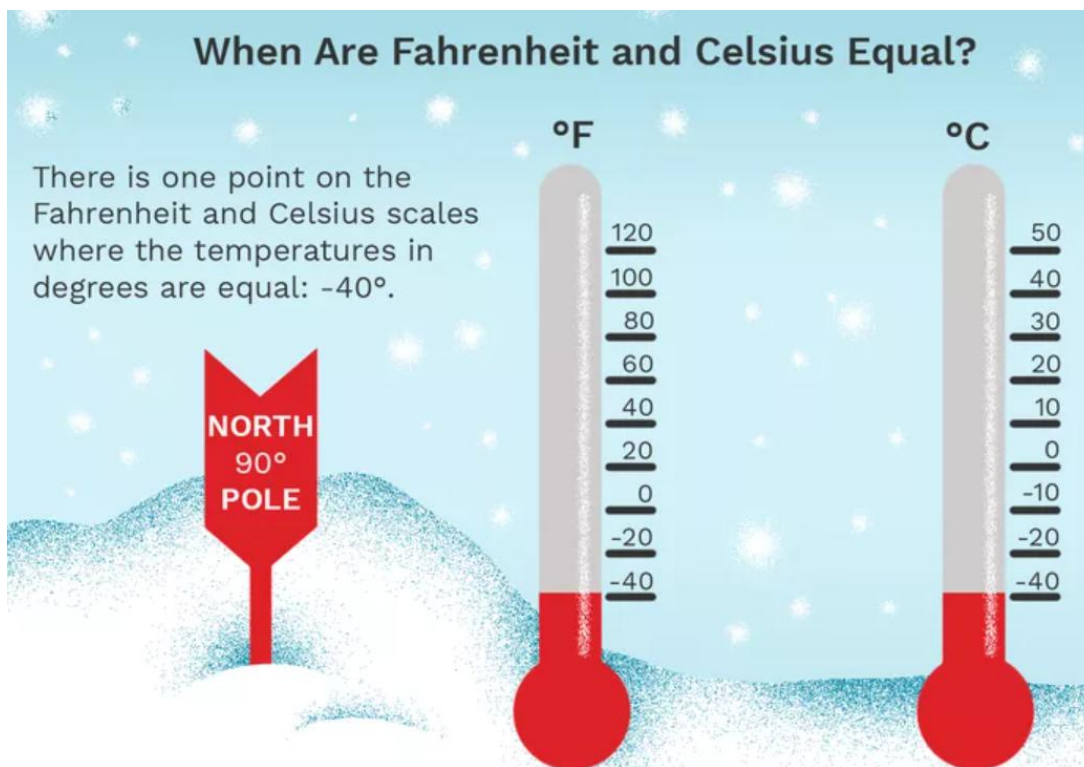
$$1^{\circ}\text{C} = 1.8^{\circ}\text{F}$$

- The scale divisions on the Kelvin Scale & Celsius Scale are equal in size Means.

One degree of Celsius scale is equal to One degree of Kelvin Scale.

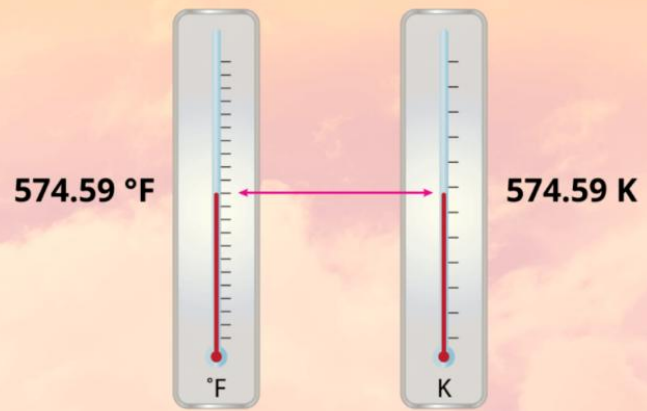
- Moreover, one degree of Celsius and Kelvin Scale is equal to 1.8 degree of Fahrenheit Scale. (If any one degree passes on Kelvin or Celsius Scale then on Fahrenheit it passes up to 1.8°.)

❖ °F and °C scales coincide at - 40 °C



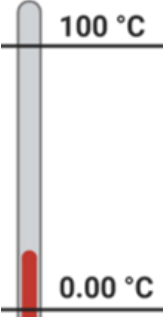
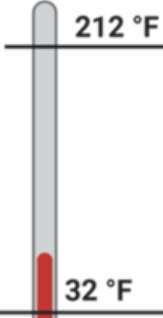
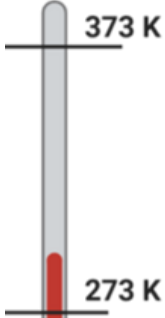
Fahrenheit and kelvin Scales
coincide at 574.25

What Temperature are Fahrenheit and Kelvin Equal?



Lecture 03: https://youtu.be/j_hnK3YeKPY?si=PlsfcZbylnoP8Qz9

To Find Empirical Formula for conversion of these Scales we must take all scales here

 100 °C B.P 0.00 °C F.P	 212 °F B.P 32 °F F.P	 373 K B.P 273 K F.P
$\frac{[\text{Temperature on 1st Scale}] - [\text{F.P}]}{[\text{B.P}] - [\text{F.P}]}$	$\frac{[\text{Temperature on 2nd Scale}] - [\text{F.P}]}{[\text{B.P}] - [\text{F.P}]}$	$\frac{[\text{Temperature on 3rd Scale}] - [\text{F.P}]}{[\text{B.P}] - [\text{F.P}]}$
$\frac{T_c - 0}{100 - 0}$	$\frac{T_F - 32}{212 - 32}$	$\frac{T_K - 273}{373 - 273}$
$\frac{T_c}{100} = \frac{T_F - 32}{80} = \frac{T_K - 273}{100}$		
This is the main Empirical Formula for conversion of Scales from one another. Now we are making formulas of conversion with the help of this Empirical Formula.		
°C ↔ °F	°F ↔ K	°C ↔ K
$\frac{T_c}{100} = \frac{T_F - 32}{80}$	$\frac{T_F - 32}{80} = \frac{T_K - 273}{100}$	$\frac{T_c}{100} = \frac{T_K - 273}{100}$
$\frac{T_c}{\cancel{100}_5} = \frac{T_F - 32}{\cancel{80}_9}$	$\frac{T_F - 32}{\cancel{80}_9} = \frac{T_K - 273}{\cancel{100}_5}$	$\frac{T_c}{\cancel{100}} = \frac{T_K - 273}{\cancel{100}}$

$\frac{T_c}{5} = \frac{T_F - 32}{9}$ This is the final formula for mutual conversion between °C to °F or °F to °C.	$\frac{T_F - 32}{9} = \frac{T_K - 273}{5}$ This is the final formula for mutual conversion from °F to K or K to °F.	$T_c = T_K - 273$ This is the final formula for mutual conversion from °C to K or K to °C.
Above formula is enough for conversion, but if you want to derive separate formula for conversion from °C to °F OR formula for conversion from °F to °C. We can convert like below.	Above formula is enough for conversion, but if you want to derive separate formula for conversion from °F to K OR formula for conversion from K to °F. We can convert like below.	Above formula is enough for conversion, but if you want to derive a separate formula for conversion from °C to K OR formula for conversion from K to °C. We can convert like below.
Drive separate formula for conversion from °F to °C. We know that $\therefore \frac{T_c}{5} = \frac{T_F - 32}{9}$ $T_c = \left(\frac{T_F - 32}{9}\right) \times 5$ Or $T_c = (T_F - 32) \times \frac{5}{9}$ Or $T_c = \frac{5}{9} \times (T_F - 32)$ This is formula of conversion from °F to °C. (When you have been given value of °F and want to find Value in °C)	Drive separate formula for conversion from K to °F. We know that $\therefore \frac{T_F - 32}{9} = \frac{T_K - 273}{5}$ $T_F - 32 = \left(\frac{T_K - 273}{5}\right) \times 9$ $T_F = \left((T_K - 273) \times \frac{9}{5}\right) + 32$ This is formula of conversion from K to °F. (when you have been given value of K and you have to find Value in °Fs.	Drive separate formula for conversion from K to °C We know that $\therefore T_c = T_K - 273$ This is formula of conversion from K to °C. (When you have been given value of K and you have to find Value in °C.
Now drive separate formula for conversion from °F to °C. We know that. $\therefore \frac{T_c}{5} = \frac{T_F - 32}{9}$ $\frac{T_c}{5} = \frac{T_F - 32}{9}$ $\frac{T_c}{5} \times 9 = T_F - 32$ $\left(\frac{T_c}{5} \times 9\right) + 32 = T_F$ or $\left(\frac{9}{5} \times T_c\right) + 32 = T_F$	Now drive separate formula for conversion from K to °F. We know that $\therefore \frac{T_F - 32}{9} = \frac{T_K - 273}{5}$ $T_F - 32 = \left(\frac{T_K - 273}{5}\right) \times 9$ $(T_F - 32) \times \frac{5}{9} = (T_K - 273)$ $[(T_F - 32) \times \frac{5}{9}] = T_K$ or $T_k = [(T_F - 32) \times \frac{5}{9}]$	Now drive separate formula for conversion from °C to K. We know that $\therefore T_c = T_K - 273$ $T_c + 273 = T_K$ Or $T_k = T_c + 273$ This is formula of conversion from °C to K. (when you have been given value of °C and you have to find Value in K.

Or

$$T_F = \left(\frac{9}{5} \times T_c \right) + 32$$

This is formula of conversion from °C to °F.

(When you have been given value of °C and want to find Value in °F.

This is formula of conversion from °F to K.

(When you have been given value of °F and want to find Value in K.

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Chapter 16: First Law of Thermodynamics:

Topic: Conversion of Work to Thermal Energy

OR

Conversion of Thermal Energy to Work

Work done on gas/system:

- Consider a cylinder filled with gas molecules of volume V , and a moveable piston over it
- Now, when the heat (Q) is supplied and Temperature (T) Increases.
- Gas molecules expand and exert Force (F) on the Area (A) piston, In this way, Pressure (P) is created.

$$\therefore P = \frac{F}{A}$$

From this relation we get value of Force

$$F = P \times A \text{----- (i)}$$

Due to the force on piston, it covers Distance/Displacement " S ".

When Displacement (S) or (d) is covered due to Force " F " then there happens some Work " W ".

$$W = F \cdot S \text{----- (ii)}$$

To Find work Put Eq(i) in Eq(ii) in place of " F "

$$W = P \times A \cdot S$$

We know that $\therefore V = A \cdot S$

So

$$W = P \times V$$

This volume is changing, That's why Delta Sign Δ is used with volume volume is changing.

$$W = P \times \Delta V$$

This is formula of Work when "**Work is DONE BY the System**".

And when "**Work is DONE ON the System**" then Minus is made accompanied with above expression.

$$W = - P \times \Delta V$$

This is formula of Work when "**Work is DONE ON the System**".

POSITIVE WORK:

Work Done by Gas/System

Due to Expansion of Gas Molecules System Does Work on Surrounding

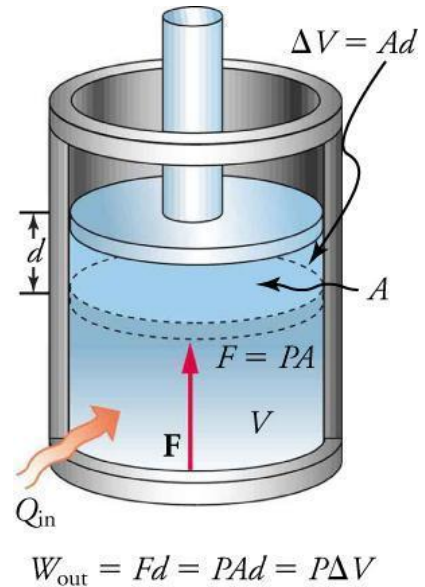
$$W = P \times \Delta V$$

Volume increases

Decrease in internal Energy (ΔU)

NEAGTIVE WORK:

Work Done on Gas/System



$$V = L \times W \times H$$

Or

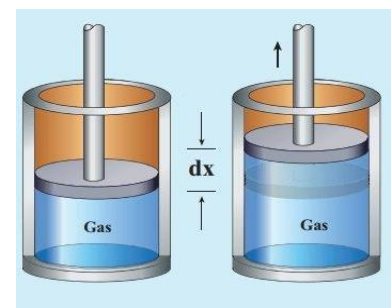
$$V = A \times \text{Length} \quad \text{or}$$

$$V = \text{Area} \times \text{Distance}$$

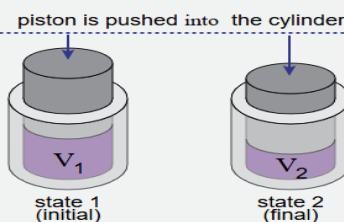
So

$$V = A \cdot S$$

Because distance=length



PV-work



this is work done on the system

$$w = -P\Delta V$$

Due to compression of gas molecules

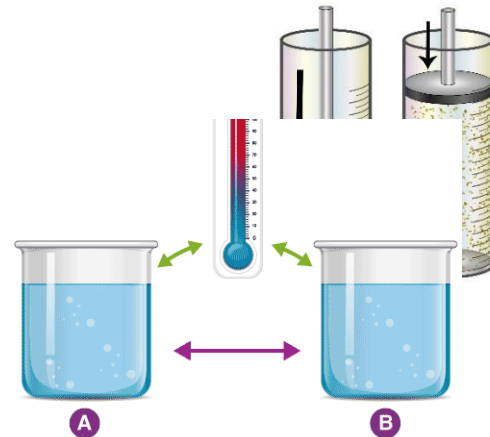
$$W = -P \times \Delta V$$

Volume Decreases

Increase in Internal Energy

ZERO WORK:

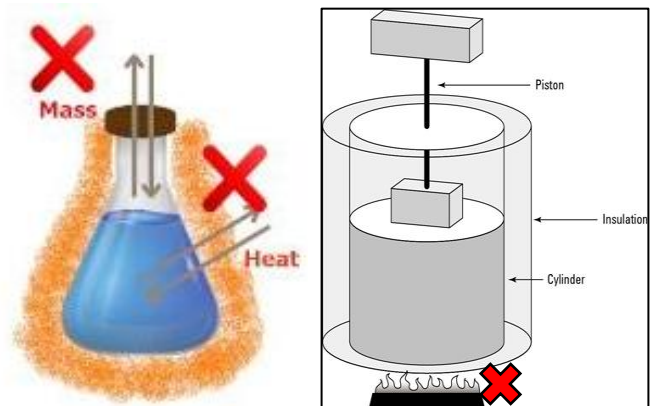
When the molecules are in Equilibrium



4. ADIABATIC PROCESS:

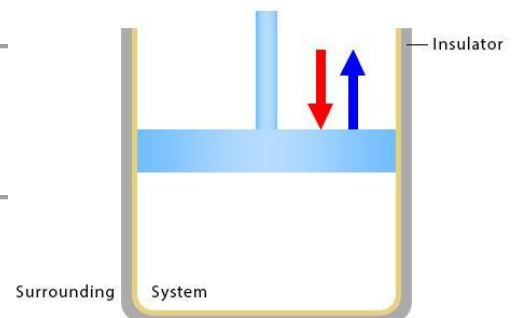
“The Thermodynamic Process during which no heat enters or leaves a system is called an adiabatic process.”

- For every adiabatic process $\Delta Q = 0$
- A truly adiabatic process is an ideal one which cannot be realized. (means, such ideal system is not present in real world)
- However, the flow of heat may be prevented with a thick layer of insulator, or by performing the process very quickly.



Adiabatic Process

No heat exchange between system and surrounding



Heat requires some time to go into or out of the system, so any process performed quickly is practically adiabatic.

To perform an adiabatic process on a gas, the gas should be in a completely insulated cylinder with a movable piston.

TYPES OF ADIABATIC PROCESS

Adiabatic Expansion

Adiabatic Compression

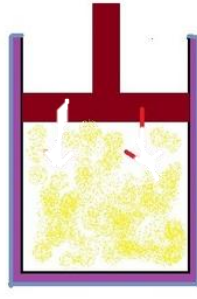
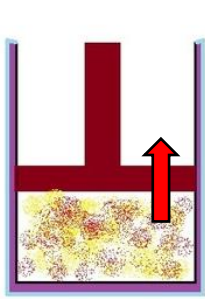
Decreasing Pressure

- If the heat is not added to the system, but the **gas is allowed to expand suddenly**, then due to this pressure on piston is decreased (and then work is done by the system).
- In result, the gas will be cooled, and due to this, its temp. decreases and so internal energy of the system also decreases.

So we understood that;

Without Addition/supply of heat from the system, Pressure, Temperature, Internal energy and work of the system can be increased/changed in adiabatic expansion.

Means $\Delta Q = 0$ here.



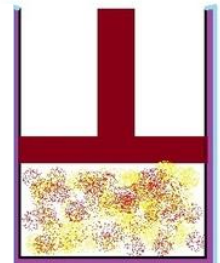
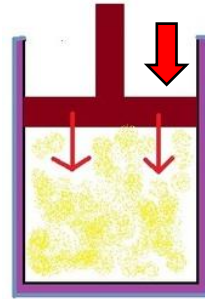
Increasing Pressure

- If heat is not removed from the system, and the **gas is compressed by suddenly increasing the pressure on the piston** (and then work is done on the system).
- In result, gas will be heated, and due to this, temp. will increase and therefore, internal energy of the gas will increase.

So we understood that;

Without removal of heat from the system, Pressure, Temperature, Internal energy and work of the system can be decreased/changed in adiabatic compression.

Means $\Delta Q = 0$ here.



So, in both $\Delta Q = 0$

According to the 1st Law of Thermodynamics:

$$\Delta Q = \Delta U + \Delta W$$

$$\Delta Q = 0$$

So,

$$\Delta U = -\Delta W$$

In adiabatic processes, work is done at the cost of internal energy.

SUMMARY OF ADIABATIC PROCESS

Which factors change and which factors do not change in Adiabatic Process in terms of P,V and T			
1	Pressure changes from P_1 to P_2 (without addition/removal of heat)	It means there is some Change in Pressure. So, Value of Pressure change is Non-Zero.	$\Delta P \neq 0$
2	Temperature changes from T_1 to T_2 (without addition/removal of heat)	It means there is some Change in Temperature. So, Value of Temperature change is Non-Zero.	$\Delta T \neq 0$

3.	Volume before heat is V_1 and after heat is V_2 . (without addition/removal of heat) and volume changed due to changes in pressure.	It means Volume changed from one value to another. So, Value of Volume change is Non-Zero.	$\Delta V \neq 0$
Which factors change and which factors do not change in Isobaric Process in terms of Q, U and W			
4.	Heat is NOT added or removed into or from the system during Adiabatic Process.	It means there is some Change in Heat Q. So, Value of Heat change is Non-Zero.	$\Delta Q = 0$
5.	Without addition/removal of heat energy, internal energy can be changed by changing pressure	It means there is no change in Internal Energy ΔU. (also because, ΔU and ΔT are directly proportional) So, value of Change in Internal Energy is zero .	$\Delta U \neq 0$
6.	Some amount of increased or decreased internal energy (due to pressure) is converted to Work done by/on the system (whereas no amount of heat is added or removed)	It means, there is some change in the Work of the system. So, value of change in Work is Non-zero ($W = P\Delta V$)	$\Delta W \neq 0$
7.	Graph		Steeper Curve
8.	Equation		$\Delta U = -\Delta W$ Or $\Delta W = -\Delta U$

Note: *Non-zero* means that anything which has some value greater than zero.

& *Zero* means that anything which has only zero value.

☐ There is no any process in all process whose P , V or T becomes Zero. In all process $P \neq 0$, $V \neq 0$ and $T \neq 0$ and these never ever becomes zero because naturally every gas has some P , V or T of its own. But change in P , V or T can be zero in any of the processes depending on the situation, So in any process it is possible to write like **$\Delta P = 0$, $\Delta V = 0$ or $\Delta T = 0$**

Summary Table:

ΔP	ΔT	ΔQ	ΔU	ΔW	PV Graph	Equation
$\neq 0$	$\neq 0$	$= 0$	$\neq 0$	$\neq 0$	Steeper Curve	$\Delta W = -\Delta U$
						$\Delta U = -\Delta W$

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Chapter 17: Second Law of Thermodynamics:

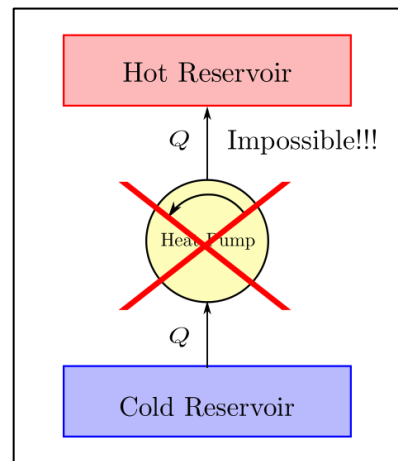
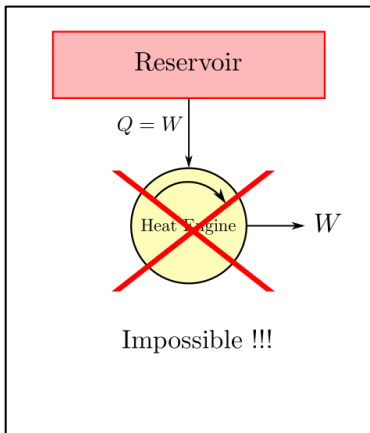
CHAPTER 18 SECOND LAW OF THERMODYNAMICS

Lecture No: 01

Topic: Second Law of Thermodynamics

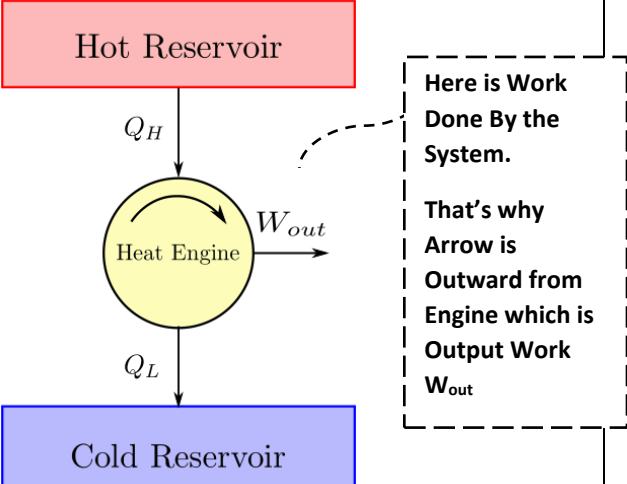
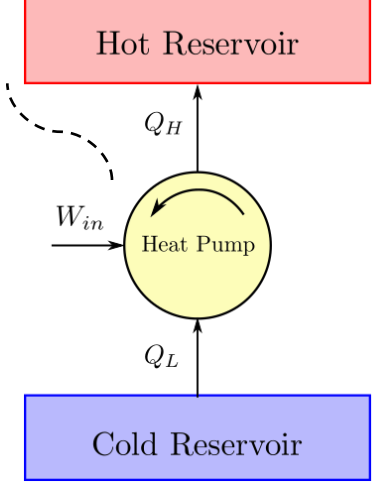
- **The Second Law of Thermodynamics** covers the limitations of "conversion of heat energy into mechanical energy."
- **Second Law of Thermodynamics** is divided into two statements:

(i) Kelvin Statement	(ii) Clausius Statement
"It is IMPOSSIBLE to construct an engine operating continuously in a cycle by taking heat from a source and converting it completely into work without loss of energy to Cold Reservoir. It cannot operate continuously in a cycle because with every cycle it wastes some energy and after some time it will stop. But, it is POSSIBLE when it has cold reservoir where it continuously lose some part of energy.	"It is impossible to cause heat to flow from a cold body to a hot body without expenditure of (external) energy." This is not possible in reverse that you transfer heat from cold body to Hot Body until & unless External Energy is not supplied to do so. But it POSSIBLE when you supply External Energy (Work) and then transfer heat from Cold object to Hot object.



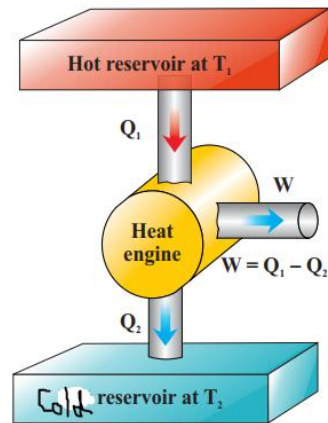
Here is Work Done ON the System.

That's why Arrow is Inward to Engine which is External Work W_{in} or W_{ex} for the purpose to Transfer Heat from Cold to Hot Body.

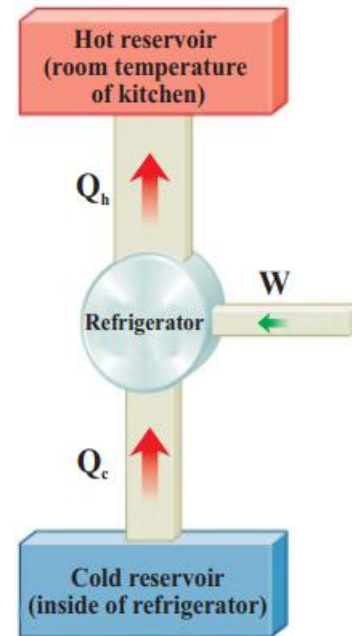
	
Yahn per Hot Reservoir ka Arrow Heat Engine mn Andar jar ha hy jo ky usko input energy de raha hy ... Ab is input Energy ka kuch hisa Work hoga aur baqi zyada hisa zaya hoga cold reservoir main. W_{out} ka Arrow $\rightarrow$ bahar ki taraf hy joky ye bata rha hy ky kuch us ny kam kia hy ya output dya hy.. aur sath mn ek arrow cold Reservoir ki taraf bhi ja rha hy nechy jo ye bata rha k kuch energy ka amount zaya bhi huwa hy	Yahn par Cold Reservoir ka Arrow $\rightarrow$ Engine mn jar ha hy matlb ye ky engine ny ab is cold body ki heat ko transfer karna hy Hot Reservoir ki body m.. Aur esa krna Engine ky liye difficult hy .. is liye Engine ko thori help chahye is qism ka ulta kamkrny ky liye .. tbhi bech m hum ny Engine ko External Work (Energy) di hy .. jo engine ko force kary gi ya help kary gi k wo Cold Reservoir ki Heat Hot Reservoir mn bhej saky. Aur fr isi wajah sy Engine/ Working Substance sy Arrow Hot Reservoir ki janib ja raha hy.
Explanation: 1. An engine can't convert all heat energy into mechanical energy (work). 2. It is impossible to make an engine which would have 100% efficiency. (Even though the First Law of Thermodynamics looks opposite to it still applies and satisfied here.)	Explanation: 1. Heat energy can't flow from a lower temperature (cold body) to a higher temperature (hot body) without the supply of external energy or doing work on it. 2. No one has ever built such a device (or refrigerator) which will work without a supply of energy.
Process: (i) A heat engine gets heat from the hot reservoir (T_h) or (T_1) (ii) The working substance converts heat energy into work (work done by the system).	Process: (i) A hot reservoir gets heat from the cold reservoir.

(iii) The remaining heat energy will be transferred to the condenser (cold reservoir)

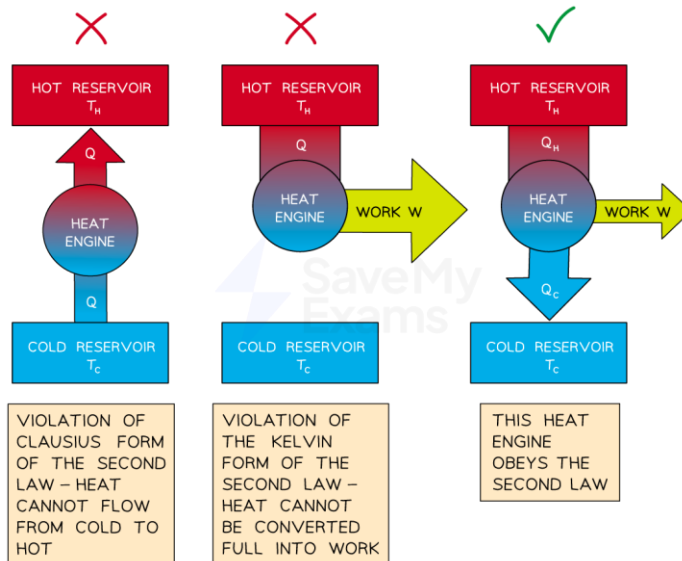
Some Part of the heat is rejected to cooler bodies.



(ii) To do this, external energy is given or work is done on the system.



SUMMARY



Lecture No: 05

Topic: Carnot Engine

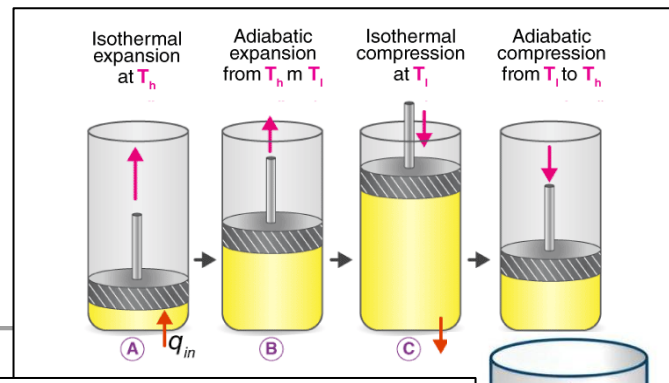
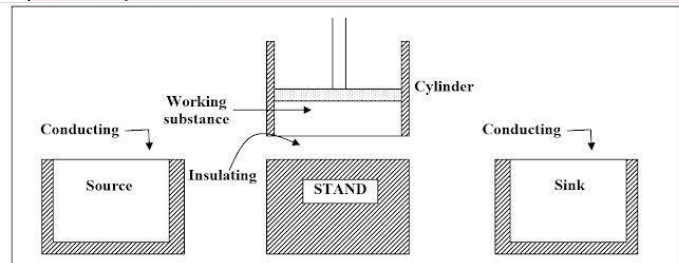
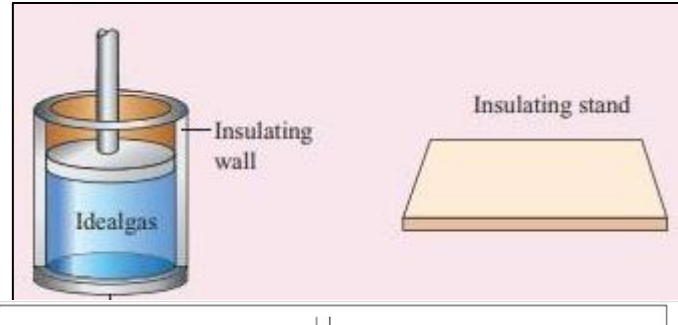
- Designed by Sadi Carnot in 1824.
- Ideal Engine (free from heat losses and friction).

Components:

- Hot body
- Cold body
- Perfect heat insulator
- Piston
 - It is a theoretical model.
 - It has two isothermal and two adiabatic processes.
 - It has four Carnot Cycles.
 - Real Engines are less efficient than the Carnot Engine.
 - Carnot Cycle represents an ideal reversible process.

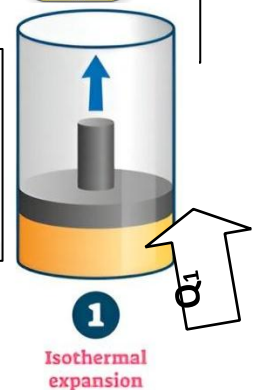
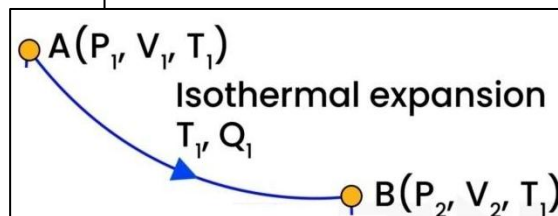
Carnot Cycle:

1. Isothermal Expansion
2. Adiabatic Expansion
3. Isothermal Compression
4. Adiabatic Compression



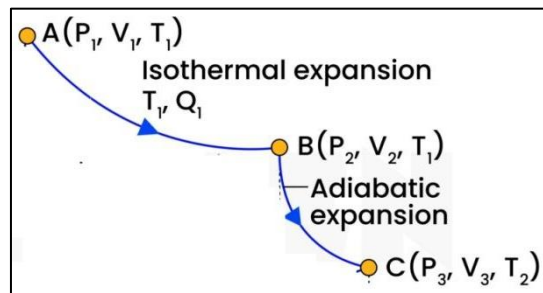
1) Isothermal Expansion (A → B):

- Cylinder is in **thermal contact** with heat reservoir at T_1 .
- During expansion, **load on piston is decreased**.
- Gas absorbs Q_1 from the reservoir.
- Volume increases from V_1 to V_2 , performing work.
- Work done: $W_{a \rightarrow b} = Q_1 - Q_2$
- Expands at constant temperature.
- Work done by system.



2) Adiabatic Expansion (B → C):

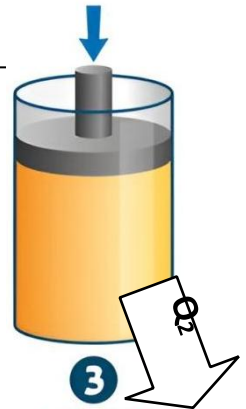
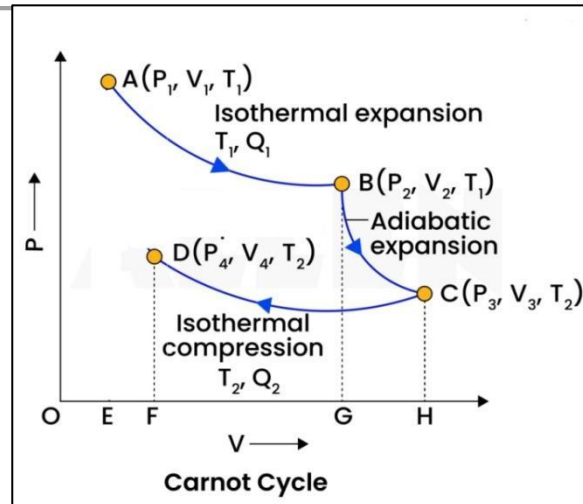
- Base of cylinder is thermally non-conducting.
- Gas expands without heat exchange (due to reduced piston load).
- Temperature decreases from T_1 to T_2 .
- Volume increases from V_2 to V_3 .
- Work is done by the gas in raising piston.
- Work done: $W_{b \rightarrow c} = T_1 - T_2$
- Volume expands without adding or removing heat.



2
Adiabatic expansion

3) Isothermal Compression (C → D):

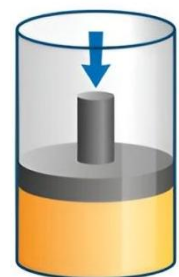
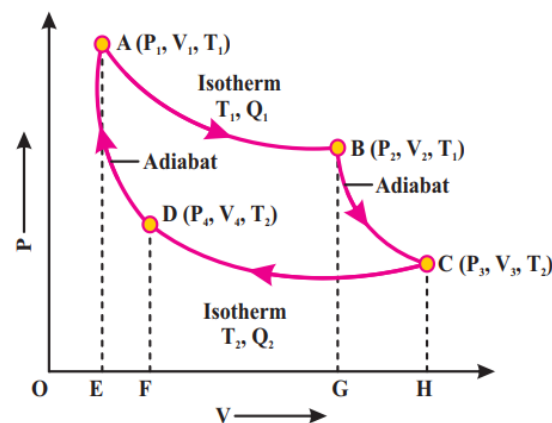
- Cylinder is in **thermal contact** with heat reservoir at T_2 .
- Gas is **compressed isothermally** by applying force on the piston.
- Volume decreases from V_3 to V_4 by expelling heat energy Q_2 .
- Work is done on the system from C to D.
- Volume compression by keeping T constant.



3
Isothermal compression

4) Adiabatic Compression (D → A):

- Base of cylinder is non-conducting.
- Gas is compressed without heat exchange (increase in piston load).
- Temperature increases from T_2 to T_1 .
- Volume decreases from V_4 to V_1 .
- Work is done on gas.

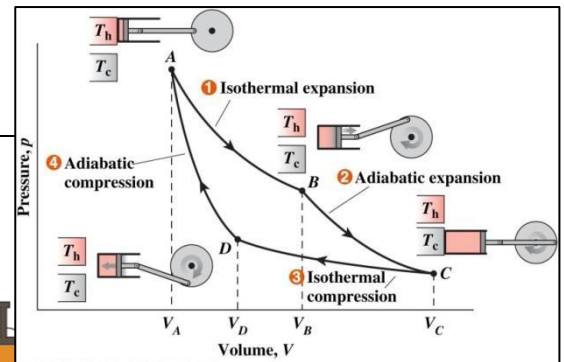
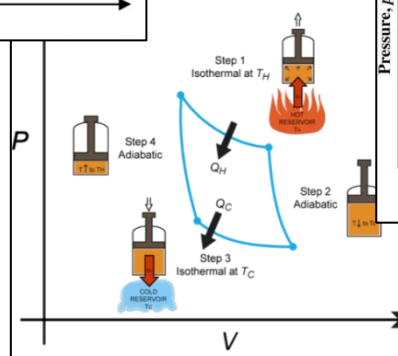
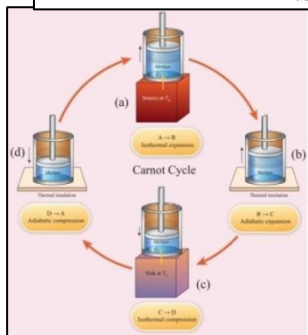
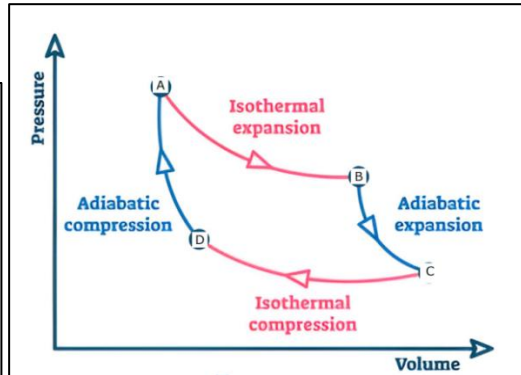
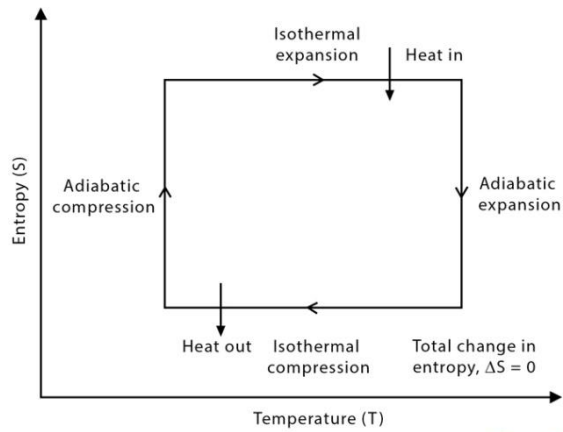


4
Adiabatic compression

- Volume compresses without leaving heat energy.

adding or

Carnot Engine Entropy



Lecture No: 06

Topic: Efficiency of Carnot Engine

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CHAPTER 18 MAGNETIC FIELD

Lecture No: 01

Topic: Introduction

Magnetic Field: It is a region

→ It is a region around a magnet within which it **attracts or repels** other magnets (*or conductors or charged particles*).

OR

→ It is a region around a **current-carrying conductor** where **magnetic forces are exerted** on other magnets, conductors, or charged particles.

Magnetic field can be generated through two primary methods.

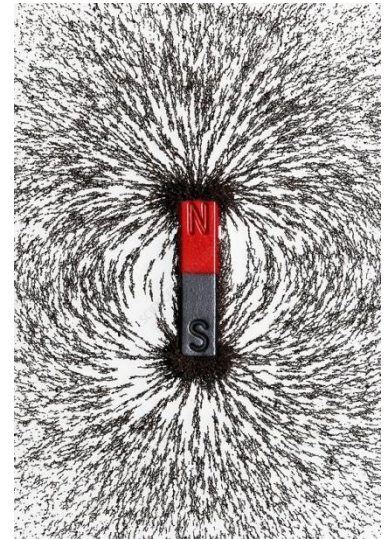
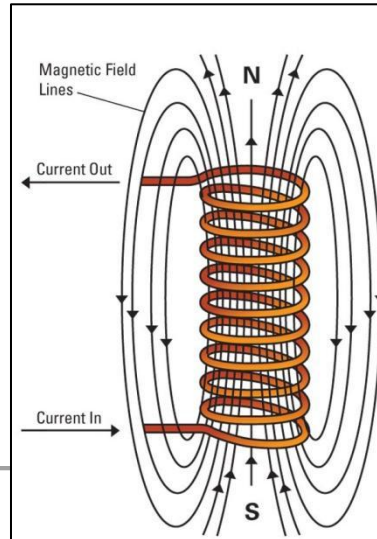
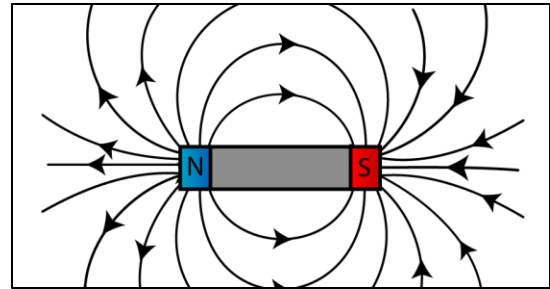
1. Magnet

Permanent Magnet

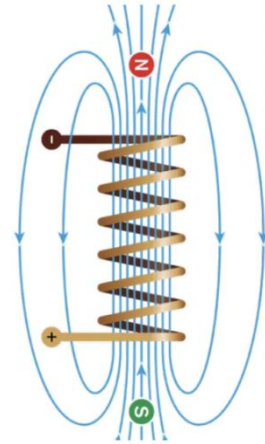
- **Poles:**
N — S
- **Like Poles Repel:**
N----N → Repel
S---- S → Repel
- **Unlike Poles Attract:**
N----- S → Attract
S -----N → Attract

2. Electromagnets (Current-Carrying Conductor)

A **current-carrying conductor** generates a magnetic field.



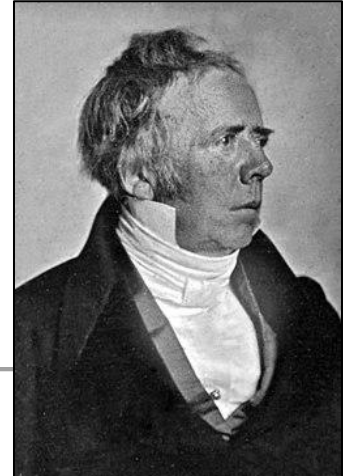
Remember!
Direction of Magnetic Field is from North to South Pole.



Lecture No: 02

Topic: How Current-Carrying Conductors Generate Magnetic Fields?

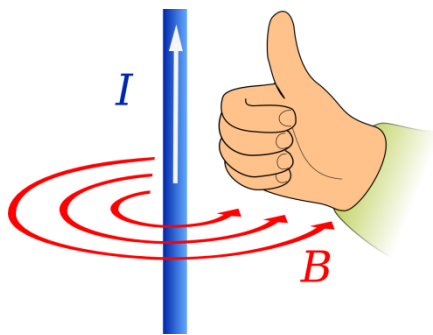
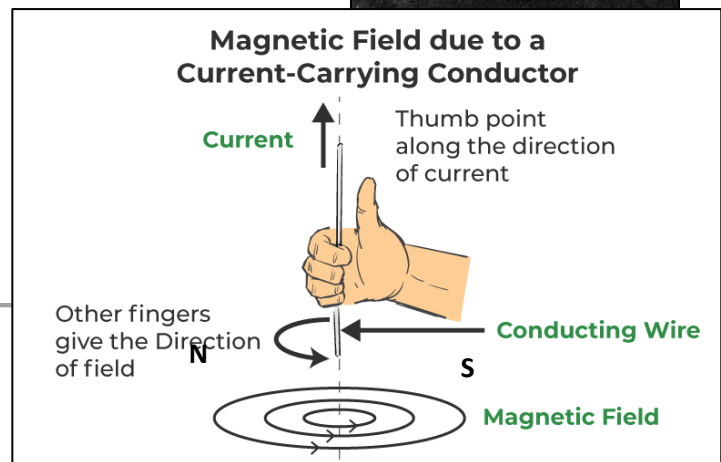
- In 1819, Hans Christian Oersted discovered how a current-carrying conductor generates a magnetic field.
- When electric current flows through a conductor, electrons move through the material. This movement of charges creates a magnetic field around the conductor.



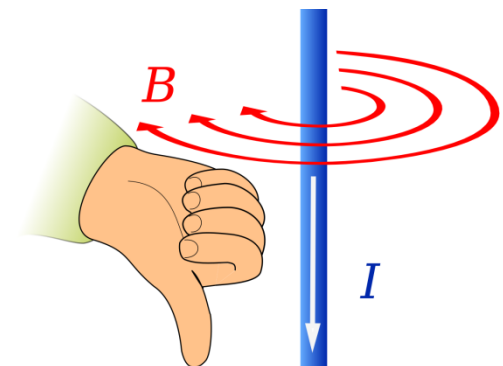
The direction of this magnetic field is based on the "Right-Hand Rule".

- If you grasp the conductor, the thumb indicates the direction of current in the conductor.
- Curled fingers indicate the direction of the magnetic field.

A current flowing in the direction shown by your thumb will generate a magnetic field that curls in the same direction as your fingers.



The magnetic field lines depend directly on the direction of the current. If the direction of current is reversed, the magnetic field lines also reverse direction.



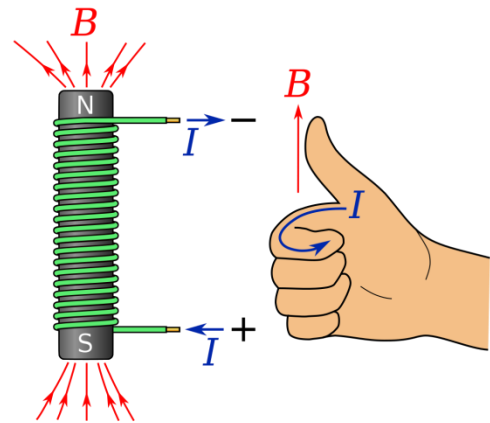
Direction of Magnetic Field (M.F.) is always from North to South Pole.

→ Arrow starts from North and finishes at South Pole.

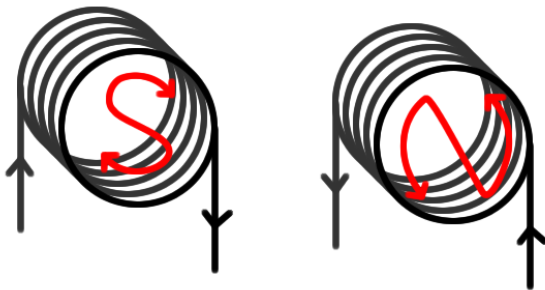
Magnetic Fields of ELECTROMAGNETS

The direction of the magnetic field of an electromagnet is found using the right hand grip rule in reverse.

The fingers curl in the direction of the current, and the thumb points in the direction of the magnetic field in the centre of the coil. Or, as shown below, the thumb points towards the North Pole.



➤ **Another method of remembering the magnetic poles in an electromagnet is shown below.**



If the current flow is clockwise at the end of the coil, then the pole is a south pole at that end. If the current flow is anticlockwise at the end of the coil, then the pole is a north pole at that end.

NOTE: It is important to not confuse the direction of the current flow with the direction the coil is wound. The direction of current flow

depends on the polarity of the voltage applied to the coil and the direction the coil is wound.

Lecture No: 04

Topic: Force Experienced by Charge placed in a Magnetic Field

- When a charge " q " moving with velocity " V " and passes through magnetic field " B ".
- Then charge " q " experiences the Magnetic Force " F ".

This force (F) depends on:

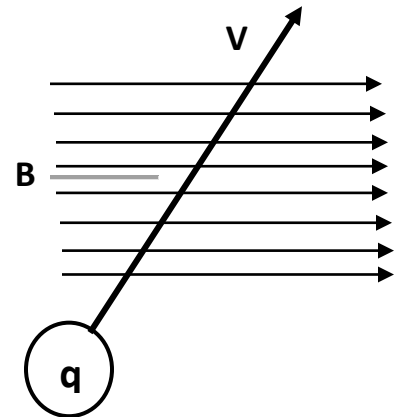
1. Magnetic field strength "B"
2. Magnitude of charge "q"
3. Velocity "V" of charge

So, Expression formula is:

$$F = qV B \sin\theta$$

Of direction of velocity V makes some angle with direction of magnetic field.

$$F = qV B \sin\theta$$



Minimum Force: ($\theta = 0^\circ$)

- When $\theta = 0^\circ$ (because V and B are parallel), then charge experiences no force.

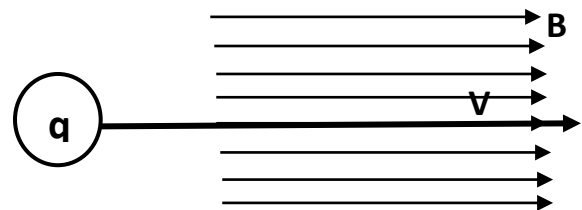
$$F = qV B \sin\theta$$

$$\theta = 0^\circ$$

$$F = qV B \sin 0^\circ$$

$$F = qV B \times 0$$

$$F = 0$$



Maximum Force: ($\theta = 90^\circ$)

- When $\theta = 90^\circ$ (because V and B are perpendicular), then charge experiences maximum force on it.

$$F = qV B \sin\theta$$

$$\theta = 90^\circ$$

$$F = qV B \sin 90^\circ$$

$$F = qV B \times 1$$

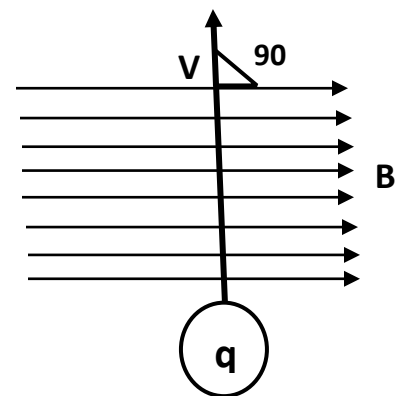
$$F = qV B$$

Derive Unit of Magnetic Field

$$F = qVB$$

$$F/qV = B \text{ or}$$

$$B = F/qV$$



Lecture No: 05

Topic: Factors on which the force acting on current-carrying conductor in magnetic field

OR

- Force experienced by a current-carrying conductor in a uniform magnetic field.
- Force acting on a current-carrying conductor depends on several factors, such as:

- o Length "L"
- o Current "I"
- o Strength of magnetic field "B"

The force is directly proportional to the strength of the external magnetic field.

$$F \propto B$$

The force is directly proportional to the current "I" passing through the conductor.

$$F \propto I$$

The force is directly proportional to the length "L" of conductor that lies in the magnetic field.

$$F \propto L$$

Combining these factors, we get:

$$F \propto BIL$$

$$F = (k)BIL \text{ (where } k = 1\text{)}$$

$$F = 1 \times BIL$$

$$F = BIL \text{ or}$$

$$F = (B \times L \times I)$$

If an angle " θ " is formed between conductor's length "L" and magnetic field (B):

$$F = BIL \sin \theta$$

Minimum force ($\theta = 0^\circ$ or 180° between L and B):

$$F = BIL \sin 0^\circ$$

$$F = BIL \times 0$$

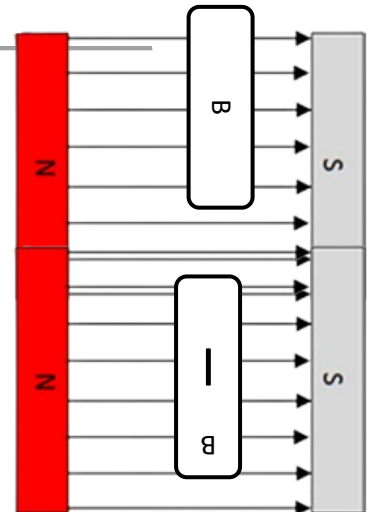
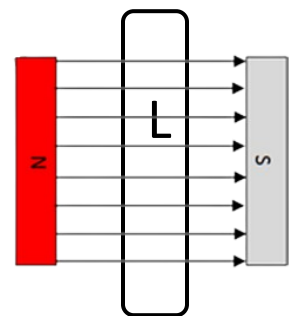
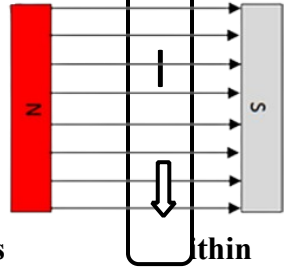
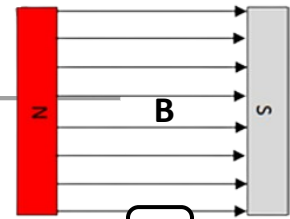
$$F = 0$$

Maximum force ($\theta = 90^\circ$ between L and B):

$$F = BIL \sin 90^\circ$$

$$F = BIL \times 1$$

$$F = BIL$$



Lecture No: 06

Topic: Torque Produced in a rectangular placed in a magnetic field.

- We know that when a current-carrying conductor is kept in an external magnetic field, then it experiences a magnetic force.
- That magnetic force **rotates** the rectangular coil. In this way, **Torque is produced**.

Because, **Turning Effect of force is known as Torque**.

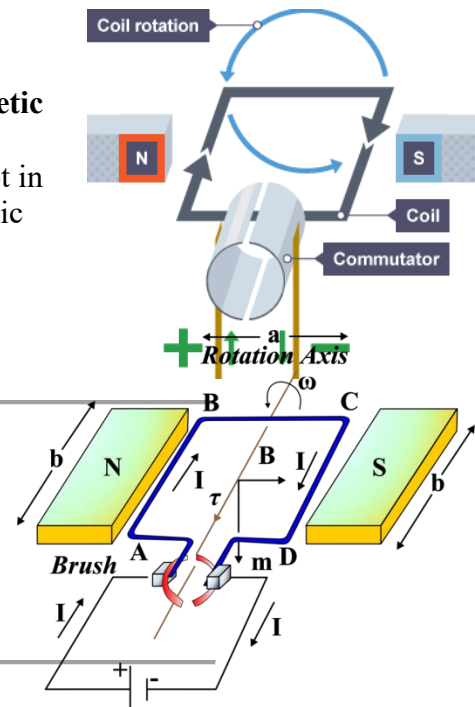
We know that

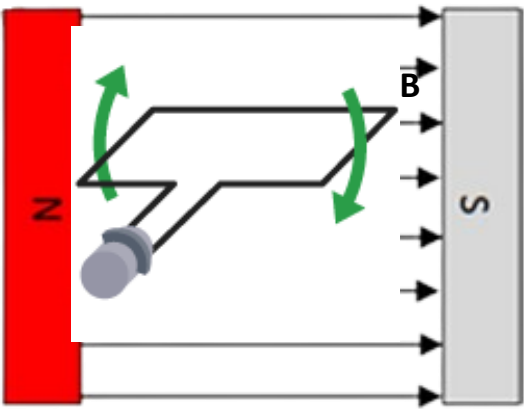
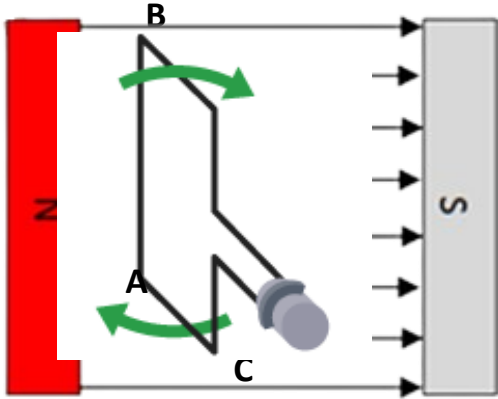
Torque = Force $\times$ Moment arm

$$\mathbf{T} = \mathbf{F} \times \mathbf{r} \quad \therefore r = L$$

$$\mathbf{T} = \mathbf{F} \times \mathbf{L} \quad \text{eq.(1)}$$

- Also, we know that when a **current-carrying rectangular coil** is kept in **B field** with some angle θ , the magnitude of force is:
 $\mathbf{F} = BIL\sin\theta$
- But here are two main angles one is zero and one is maximum and we have to use maximum angle value

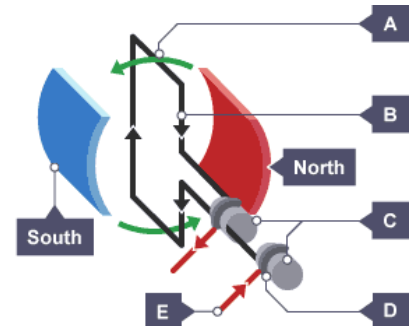


Force on sides of AB and CD Parallel to B	Force on sides of AC and BD Perpendicular to B
	
If sides of AB and CD Parallel to B then $\theta=0^\circ$	If sides of AC and BD Perp: to B then $\theta=90^\circ$
$F = BIL \sin \theta$ $F = BIL \sin 0^\circ$ $F = BIL \times 0$ $F = 0$	$F = BIL \sin \theta$ $F = BIL \sin 90^\circ$ $F = BIL \times 1$ $\mathbf{F = BIL}$ eq.(2) (Maximum Force)
Since $\theta=0^\circ$ Since $\sin 0=0$	$\theta=0^\circ$ Since $\sin 90=1$

No force is exerted on rectangular coil that's why no torque is produced here
 $T = 0$

So force is exerted on the rectangular coil that's why torque is produced here.
 $T = \text{Maximum}$

- Now, put (2) in (1):
 $T = BIL \times L$
 $T = BI \times A$ (since $L \times L = A$)
- Torque also depends on the **number of turns (N)** of the coil.
 $T = BIAN$



Angle is formed between **B** and **I**
 $T = BIAN \sin\theta$ or
 $T = BIAN \sin\infty$

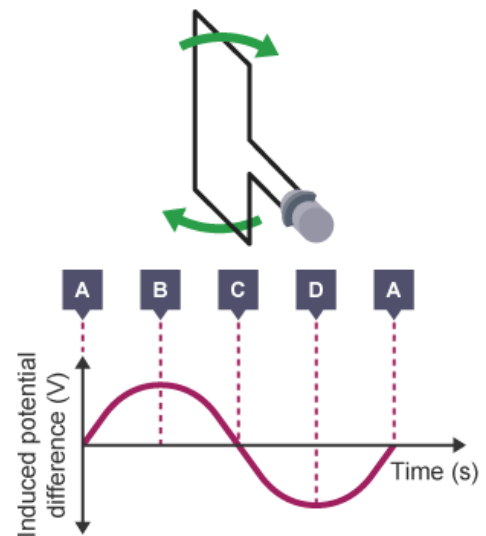
Minimum Torque ($\theta = 0^\circ$)

- When $\theta = 0^\circ$
 $T = BIAN \sin\theta$
 $T = BIAN \sin 0^\circ$
 $T = BIAN \times 0$
 $T = 0$

- A The coil is rotated in the magnetic field
- B Current is induced in the rotating coil
- C Slip rings connected to the coil
- D Brushes make continuous contact between the external circuit and the slip rings
- E Current flows in external circuit

Maximum Torque ($\theta = 90^\circ$)

- When $\theta = 90^\circ$
 $T = BIAN \sin\theta$
 $T = BIAN \sin 90^\circ$
 $T = BIAN \times 1$
 $T = BIAN$



Lec07

Before going to study about magnetic flux, first we study about just **FLUX**

Flux: The mass or energy crossing per unit area when area is normal to it.

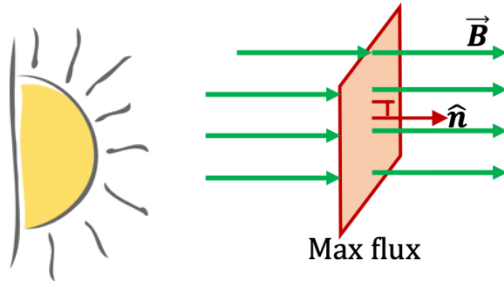
Types of Flux:

1. Sun flux

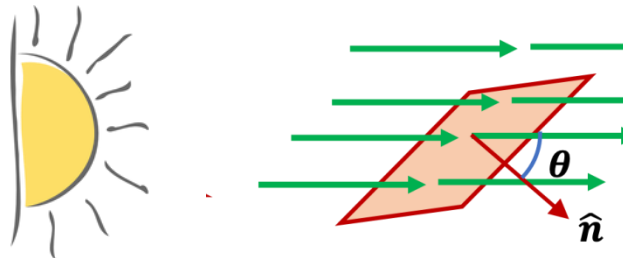
2. Luminous flux
3. Electric Flux
4. Magnetic flux

Example of Sun Flux

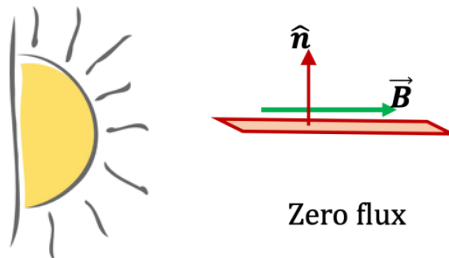
Sun Flux: Flux $\rightarrow$ Maximum



Flux $\rightarrow$ Less



Flux $\rightarrow$ Zero



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Chapter AC CIRCUITS

Lecture 01

Page # 102

Topic: Introduction of AC Current

<https://youtu.be/zi8k69PWuYc?si=uUrEADQuDPKdDPC2>

AC Current:

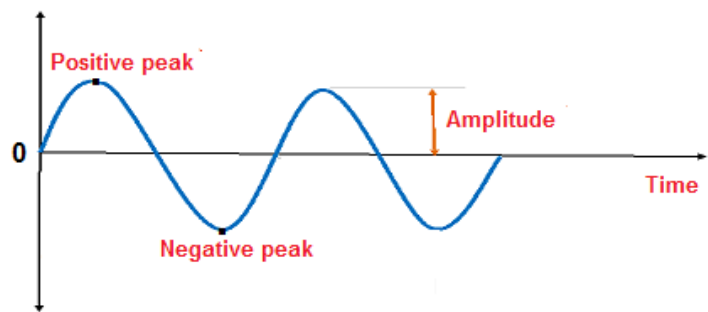
It is known as **Alternating Current**. It **changes its direction** many times a second at regular intervals.

- It is **Type of current** that **changes its magnitude and polarity** continuously at regular intervals of time.
- **Alternating Current (AC)** has two halves in one cycle.

AC Terminologies

Positive half cycle:

- On this cycle, current flows in **one direction**.
- **Positive Peak (+A)**



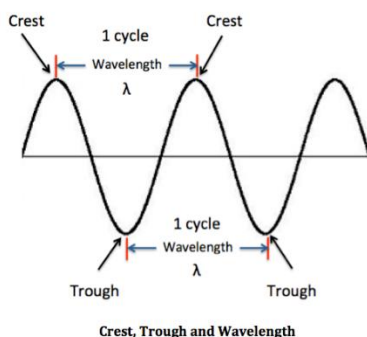
Negative half cycle:

- On this cycle, current flows in **opposite direction**.
- **Negative Peak (-A)**

The nature of AC current is to flow in Sinusoidal pattern.

This sinusoidal nature is **fundamental to know** how AC is **generated and utilized in power system**.

That's why, **waveform of AC is written in sinusoidal waveform**.



Lecture 02

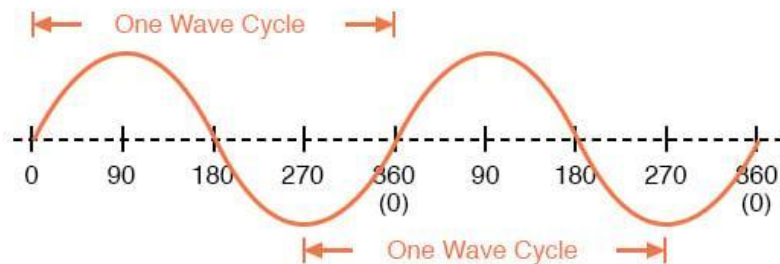
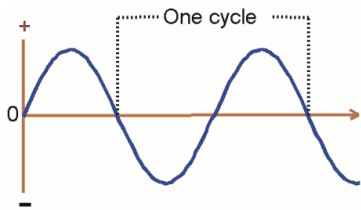
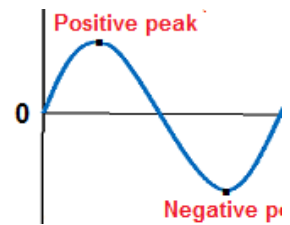
Page # 104

Part-1 <https://youtu.be/otusna1bXos?si=vZuIO13DEf6ZtN7C>

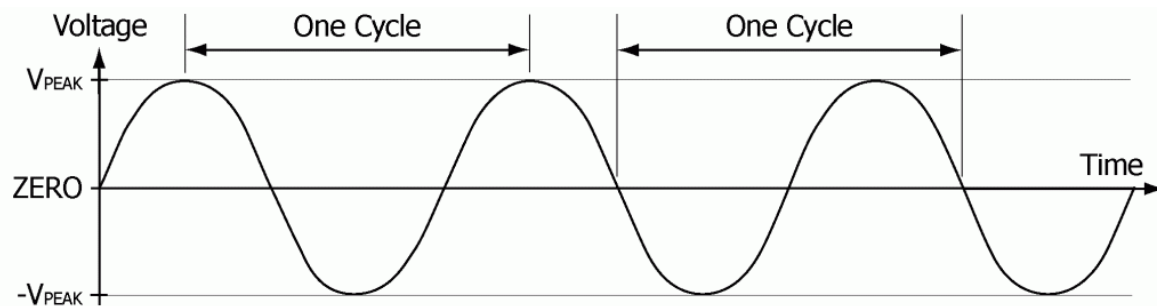
Topic: AC Terminologies

(1) Cycle

- One complete set of both **positive** and **negative** values of AC current makes **one cycle**.
- **Positive ½ cycle**
- **Negative ½ cycle**

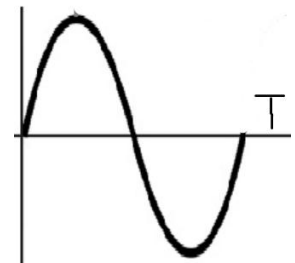


See how Cycle can be from one point to another in different ways.

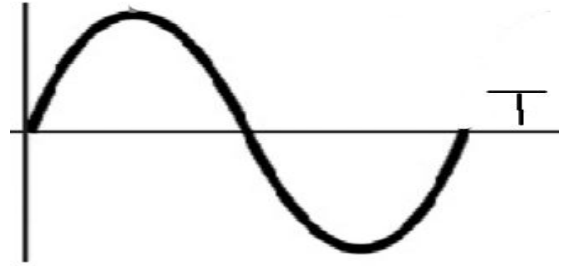


(2) Time Period (T)

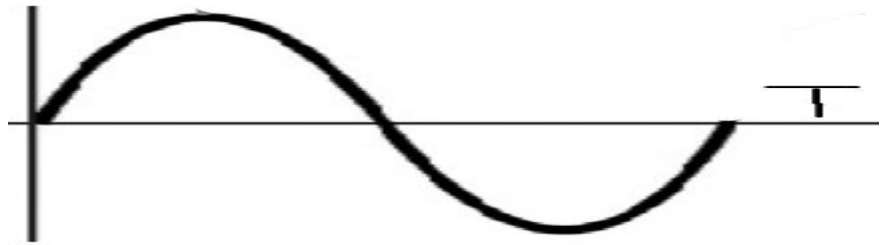
- **Time Period (T)** is the duration to complete **one full cycle**.
 - **Time Period is inverse of frequency**
 $T = 1 / f$
 - **Time Period = 1 / Frequency**
 - **Time Period is typically expressed in seconds (s).**
- If the time taken by one cycle to complete is 1 second, then Time Period is also 1 Second. $T=1$ Second



- If the time taken by one cycle to complete is 100 second, then Time Period is also 100 second.
 $T=100$ Seconds



- If the time taken by One Cycle to complete is 786 seconds, then Time Period is also 786 Seconds
 $T=786$ Seconds

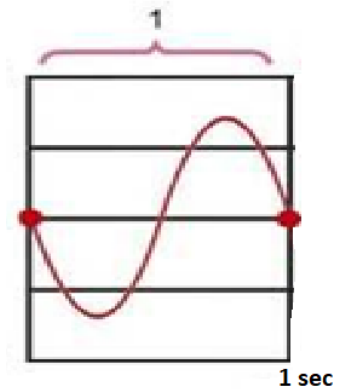


That's why we say: The time which is taken by AC wave to complete one cycle, that duration of time is known as Time Period.

*Ek cycle koporahonymnjitna time lagyga
Us time ko hum kahingy Time Period.*

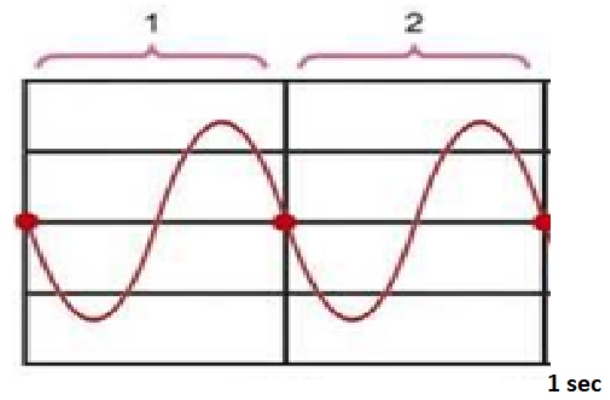
(3) Frequency (f):

- Frequency tells how many cycles complete in one second.
- Frequency = Number of cycles / 1 second
- $f = 1 / T$
- If one cycle completes in one second, then frequency is One Hertz (1 Hz).
- Unit of frequency is Hertz (Hz).
- It tells how rapidly the AC changes its direction.

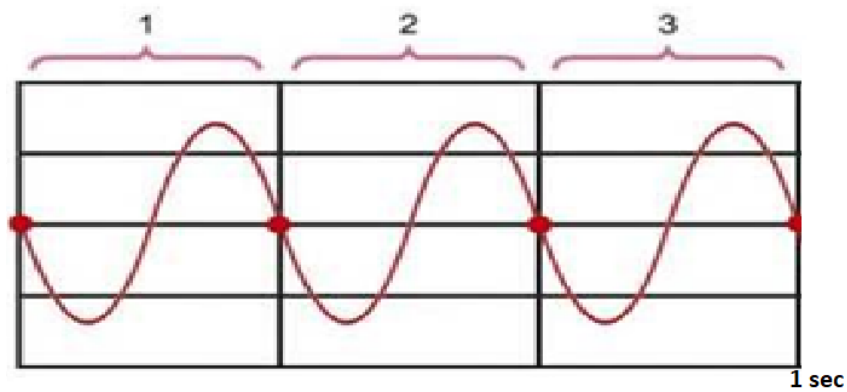


- If **One Cycle** is completed in **One Second**, then frequency is 1Hz

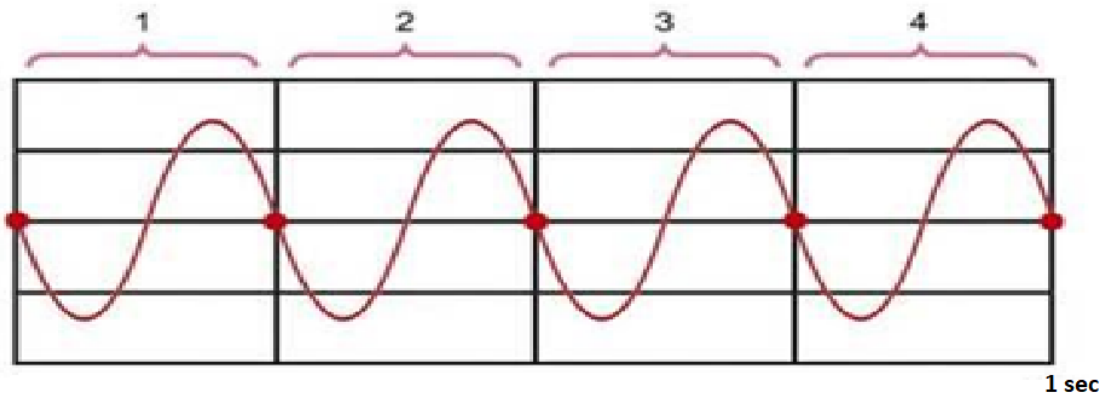
- If **Two Cycles** are completed in **One Second**, then frequency is 2Hz.



- If **Three Cycles** are completed in **One Second**, then frequency is 3Hz.



- If **Four Cycles** are completed in **One Second**, then frequency is 4Hz.



- If **Fifty Cycles** are completed in **One Second**, then frequency is 50Hz.

That's why we say: No. of cycle completed in one second Is know as frequency and its formual is also

Frequency= Number of Cycle/one Second

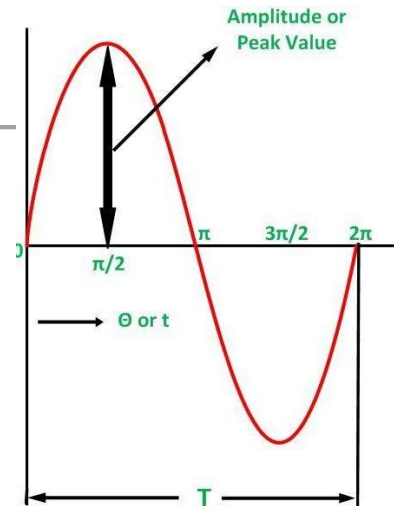
Jitnibhi cycles hon magar sari poriek second main hongti un cycles katadad frequency kaha jai ga.

Lec2 (part-2)

<https://youtu.be/4IXWx5fVb1E?si=3pSpGMKASQc62Oq>

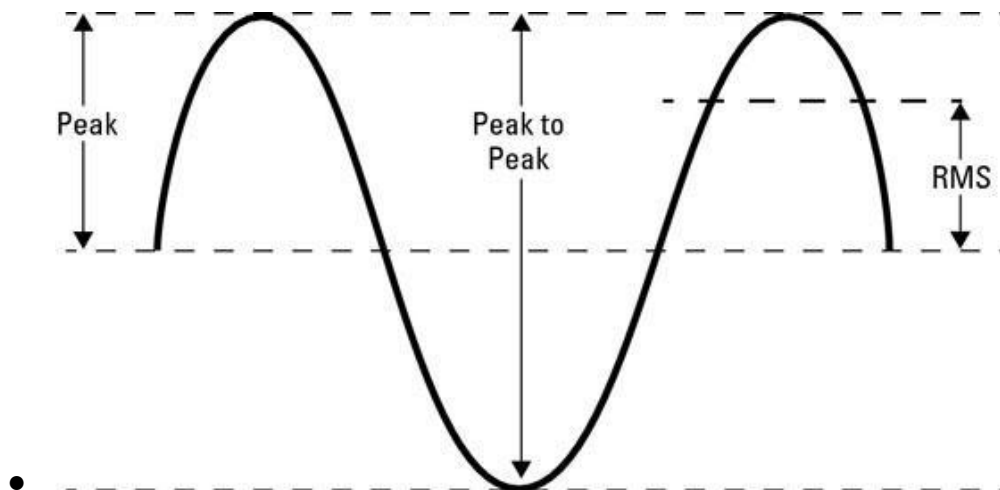
(4) Instantaneous Peak Value

- It is the maximum amplitude value of Alternating Current or Alternating Voltage (can be either positive or negative).
- Denoted by I_{peak} or V_{peak} .



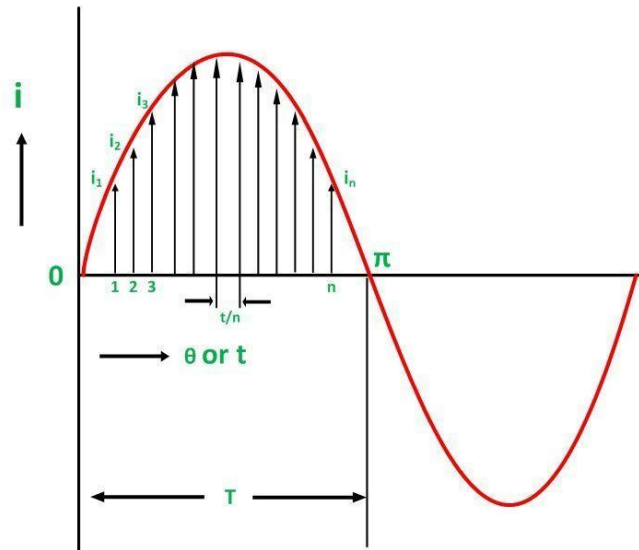
(5) Peak to Peak Value (V_{pp})

- $I_{pp} = I_p$
- $V_{pp} = 2 \times V_{peak}$



(6) Average Value (V_{avg}) (I_{avg})

- The average value of an AC quantity in one cycle is known as average value.
- $I_{avg} = I_p \times 0.637$
- $V_{avg} = V_{peak} \times 0.637$
- Average value of AC voltage or AC current is useful in power calculations because it is made up of one positive and one negative cycle, so the average is zero.



(7) Root Mean Square Value (RMS Value) (V_{rms}) (I_{rms})

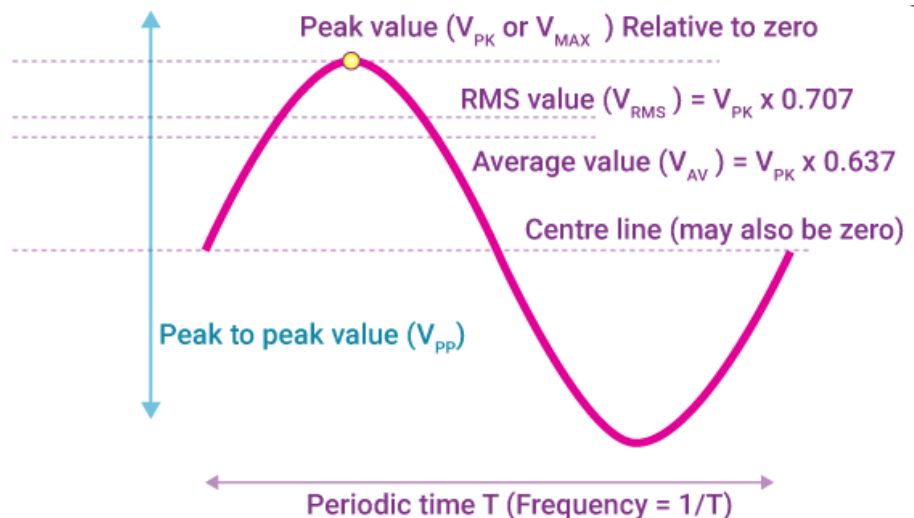
- Root mean square (RMS) value is the square root of the mean (average) of a quantity.
- $I_{rms} = \sqrt{\text{Mean}}^2$ value
- $I_{rms} = \sqrt{\text{Average}}$
- RMS of AC is the amount of AC power that produces the same heating effect as DC power.

★Root mean Square (RMS) Value is the square root of the mean (average) of a quantity.

$$I_{rms} = \sqrt{(\text{Mean})^2}$$

$$I_{rms} = \sqrt{\text{Average}}$$

$$I_{rms} = \sqrt{(\text{Average})^2}$$



★RMS of AC is the amount of AC power that produces the same heating effect as DC power.

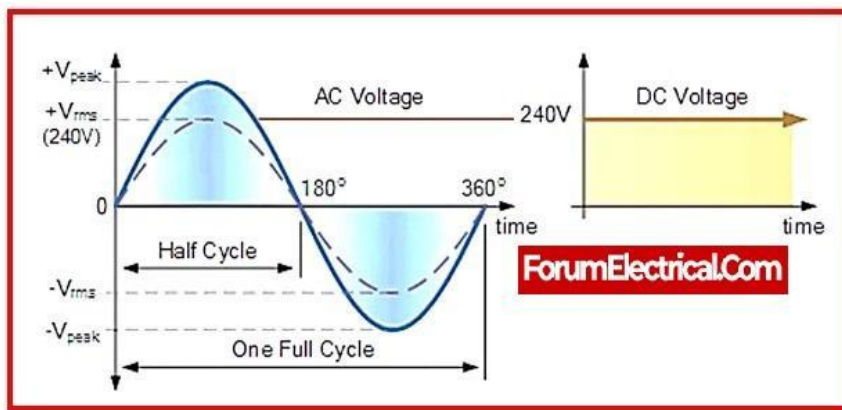
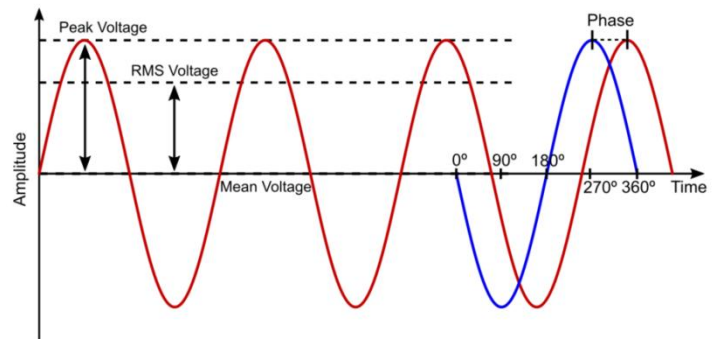
$$V_{\text{peak}} = \sqrt{2} \times V_{\text{rms}}$$

★RMS value is 70% of Peak value.

For a sinusoidal waveform, the RMS value is approximately **0.707 times** the peak value.

$$V_{\text{rms}} = 0.707 \times V_{\text{peak}}$$

or $I_{\text{rms}} = 0.707 \times I_{\text{peak}}$



Unit 20 Lecture: 06

<https://youtu.be/3uecWiW652w?si=FTNQqWBao1GSbvRV>

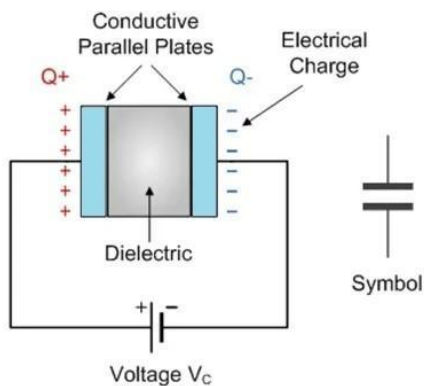
Page # 108-110

Topic: DC Through Capacitors

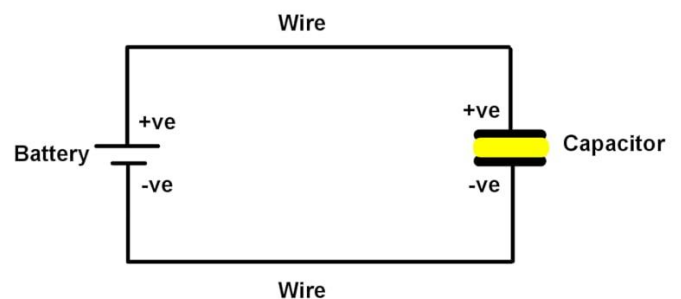
Background:

→ Behavior of DC Current through Capacitors

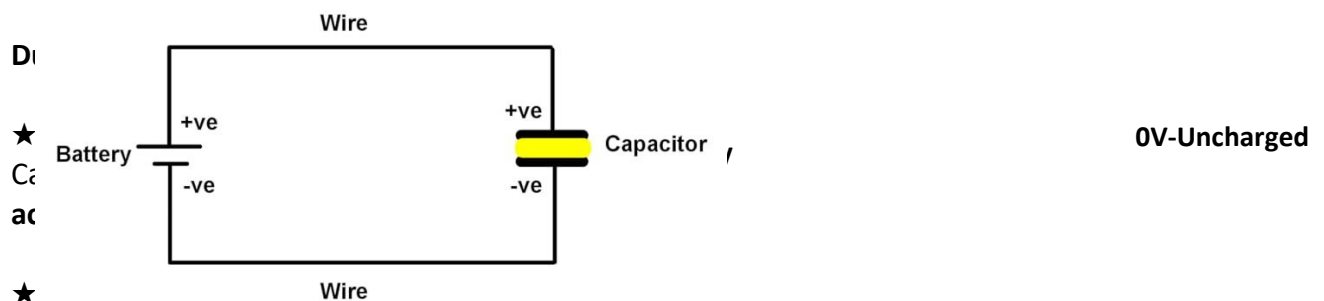
★ When **Capacitor** is connected to a **DC supply voltage**



★ Then, **Capacitor plates slowly store charge** until the voltage across the capacitor equals the **Source Voltage**.



★ Capacitor keeps this charge as long as **the source supplied voltage is attached**.



★ the Capacitor plates are uncharged.

(ye ese he jese jab pet khali hotahy tu tezi sy sab kuch andar pet mn khaty jaty hn....magarjesejese pet bhartajatahytu hum khanaandar pet mnlenakamkrtyjatyhnaurakhirmn jab pet bharjatahytujald he exponentially current yani food lena/khana band krardetyhn.)

★**Decreasing Exponentially** over time, until the capacitor reaches full charge.

Once Fully Charged:

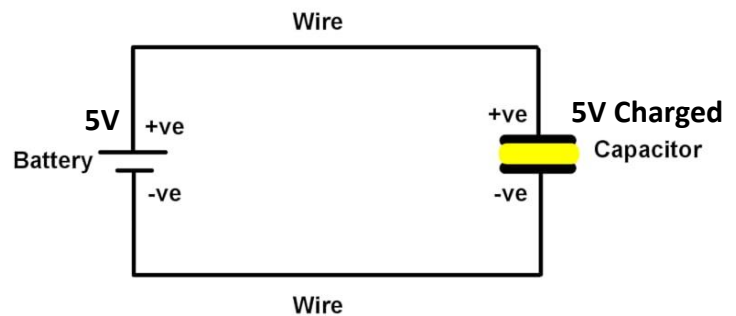
(jab capacitor ka pet bhar chukka hogayani agar 5V ka capacitor hytu 5V usko mil chukay ab no further current/food goes inside it)

★**No further current can flow** into the capacitor, and it **just blocks** DC flow & **acts as open** plates.

★**So, we can say:**

→ **Capacitor blocks DC Current after a short transient time.**

★**This is because the electric field** between the capacitor plates **prevents further charge storage.**



★ This means when **Capacitor is fully charged**, then the capacitor **acts as an Open Circuit for DC current.**

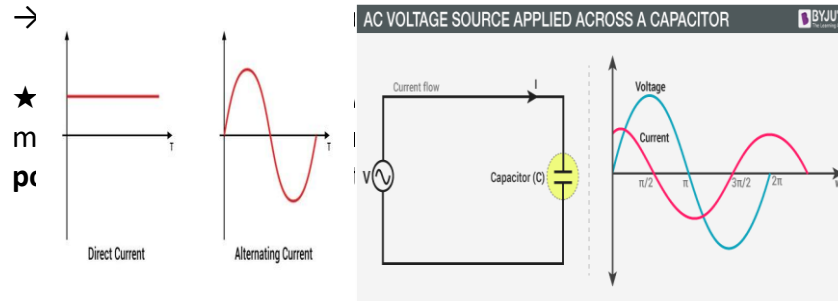
- Open circuit is that circuit which do not let current to pass from it
 - And same Open Circuit type behavior is adopted by capacitor when the capacitor is fully charged.
 - Close Circuit is that circuit which let current to pass from it
 - And same Close Circuit Type Behavior is adopted by capacitor when it is not charges or less charged.
 - So we can say that when Capacitor is Un-charged (khali pet) it act like Close Circuit and when capacitor is Fully-Charged (pet bharahuwa) then it acts like as Open Cicuit.
[[ye ese he hyjese kisi bandy (yani Capacitor) ka pet khali hoga (Uncharged) tu wo khana (Current) khaiga..... Magar jese he pet bhargaya (Charged) to wo khaanahikhaiga
-

Formulas:

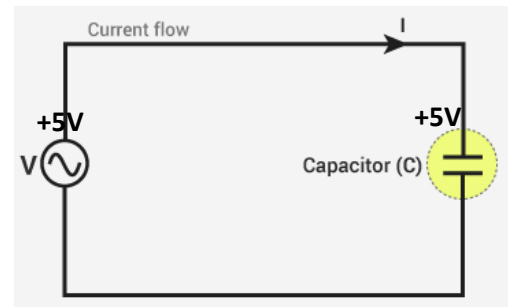
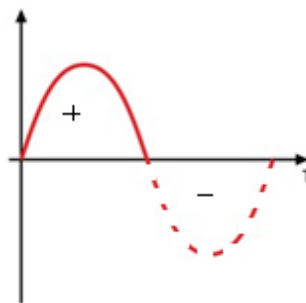
★ $Q = CV$

★ $C = Q/V$

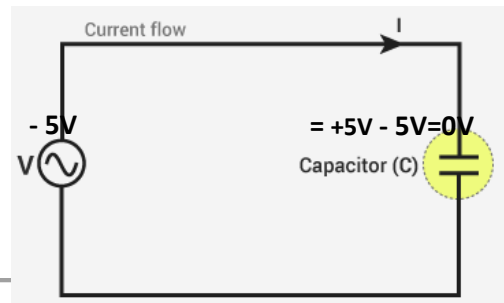
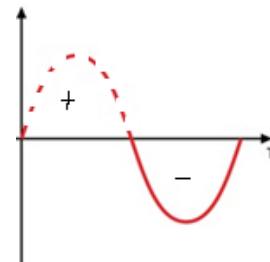
Topic: AC Through Capacitors



★Due to this, the Capacitor charges when the AC voltage is Positive.



★Capacitor discharges when the AC voltage is Negative.

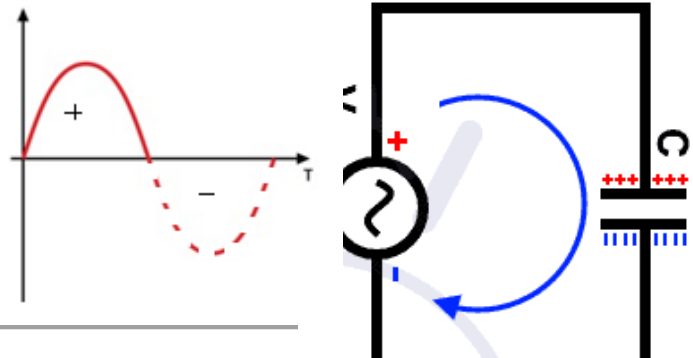


During Positive Half Cycle of Alternating Voltage:

★Electrons flow from the upper capacitor plate to the side of the Source.

★In result, the upper plate becomes positively charged (+Q), and the lower plate becomes negatively charged (-Q).

In this way it starts charging.

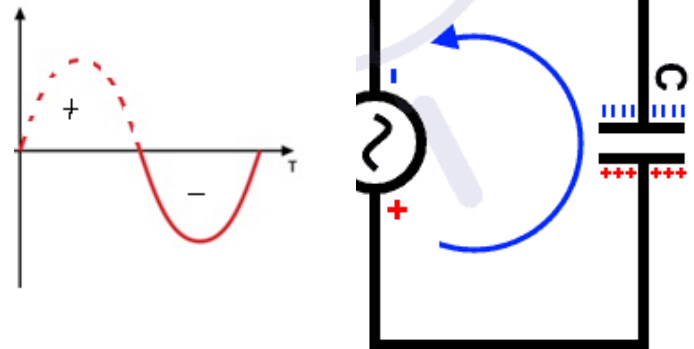


During Negative Half Cycle of Alternating Voltage:

★Direction of current flow (e^-) is reversed.

★In result, the Capacitor stores charge in the opposite manner

★ In this way, Capacitor cancels the positive stored charged with negative storage



For Example:

Capacitor was charged +5V during positive cycle

Capacitor was charged -5V during negative cycle

So the total effect during negative cycle is:

$$+5V - 5V = 0V$$

That's why we say capacitor discharges during other half of AC cycle because other half of AC will always be opposite to the first one.

Conclusion:

★In this way, the Capacitor Charges and Discharges.

★In this way, AC current flows through the Capacitor.

As the supply voltage increases and decreases, the capacitor charges and discharges with respect to this change. A current will flow through the circuit, first in one direction, then in the other

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

Chapter 21

Physics of Solids

Lecture: 01

<https://youtu.be/zi8k69PWuYc?si=a5rVt2R2LdRDKJg2>

Topic: Introduction of Physics of Solids (Solid-state Physics)

Introduction: Physics of Solids is a branch of Physics that deals with the study of physical properties of solid materials, such as;

- Electronic properties (e-)
- Magnetic properties (N-S poles)
- Optical properties (light, colors)
- Thermal properties (heat)
- Mechanical properties

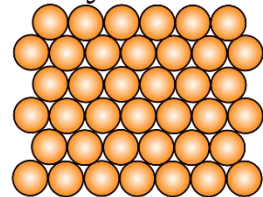
Solid: State of matter which has fixed shape and fixed volume.

- Molecules of Solids are arranged in definite pattern and in fixed position.

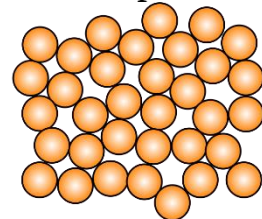
Classification of Solids

- Crystalline Solids
- Amorphous Solids
- Glass
- Polymeric
 - Raw Rubber
 - Heat -> Sulphur (with an arrow and a diagram showing a change in structure)

Crystalline



Amorphous



Definition: Physics of Solids also known as "Solid State Physics" or "Condensed matter physics."

- It deals with the study of Physical properties and behavior of Solids.

Physics of Solids helps in understanding the working and improving the efficiency of

- Solar Photovoltaic cells

- Transistor and Electronics
- Magnetic Resonance Imaging MRI
- Thermoelectric properties
- LED lights (Colors)
- Computer Memory

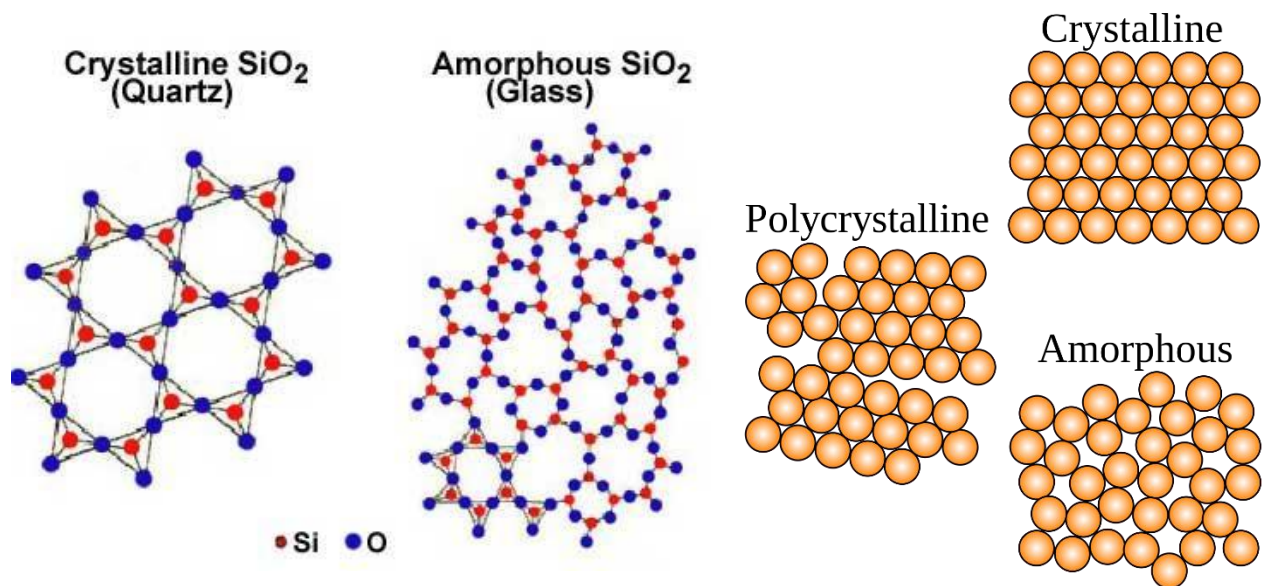
Lecture: 02

Topic: Classification of Solid

The way in which a solid behaves depends on its internal structure and type of solid.

Property	Crystalline Solids	Glassy Solids	Amorphous Solids	Polymeric Solids
Atomic Arrangement	Regular repetitive pattern of structure (Due to strong cohesive forces).	Random, short-range order.	Random, no long-range order.	Long chains or networks of repeating units (e.g., cellulose, DNA).
Melting Point	Sharp specific temperature. Due to uniform bonding, leads to a fixed temperature of breaking structure. <i>Examples:</i> NaCl: 801°C, Fe: 1535°C.	Gradual, over a range of temperature. Window glass melts around 1600°C.	Gradual, over a range of temperature. 650°C to 750°C.	Varies, typically lower than crystalline solids. 130°C to 150°C.
Rigidity	Very rigid and well-defined structure (e.g., Diamond, iron).	Rigid, but not as strong as crystalline solids.	Not as rigid as crystalline solids.	Can be flexible or rigid.
Transparency	Can be transparent or translucent. <i>Examples:</i> Regular orderly arrangement allows	Transparent, depending on composition.	Opaque.(light do not pass through such materials)	Depending on structure, can be transparent or opaque.

	predictable behavior.			
Examples	Diamond, salt crystals, silicon iron, ice (solid), zirconium (teeth filling), quartz, alum.	Window glass, certain plastics, photochromatic lenses, rubber.	Rubber, some plastics, glass, wax, metal in candle, thin films coating in CDs.	Polyethylene PVC, nylon (silk), proteins, cellulose.



Lecture: 03

Topic: Deformation

Definition:

Deformation is the change in shape or size of a solid object when external force is applied or temperature changes.

Examples:

1. When Stretching Force is applied.
 - Stretching or compressing a spring.
 - Bending a metal rod.
 - Squashing a ball.

- Crushing a can.

Example:

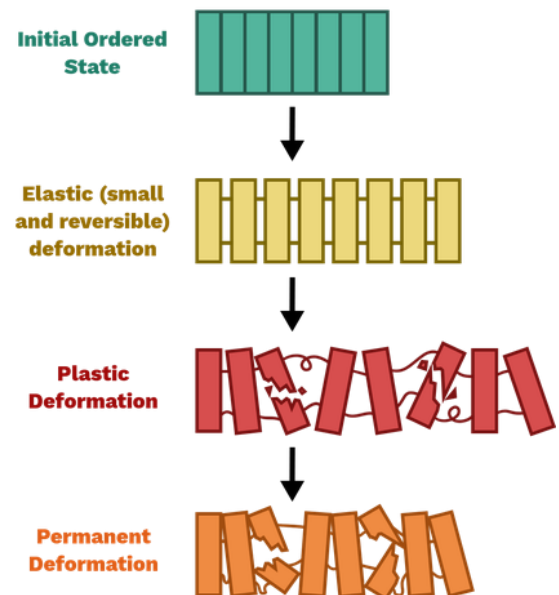
2. Deformation when there is **change in temperature**.

Expansion when heated or contraction when cooled.

- When a metal rod is heated, it expands.
 - This can be seen in railroad tracks.
 - **Bimetallic Strip.**
 - **Glass container (Thermos).**
 - **Bridge Construction** (gap is left for blocks because of compression/expansion of solids).
-

Types/Modes of Deformation Based on Material Behavior:

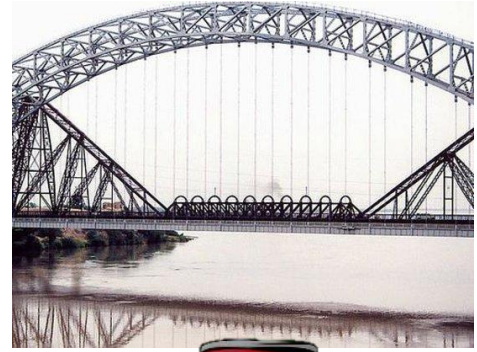
1. **Elastic Deformation:**
 - Temporary deformation.
 - A material returns to its original shape when the force is removed.
 - **Example:** Stretching of a rubber band.
2. **Plastic Deformation:**
 - Permanent deformation.
 - The material does not return to its original shape even after the force is removed.
 - **Example:** Crushing a soda can, bending a copper pipe, rolling a metal rod.



Types of Deformation Based on Force:

1. Tensile Deformation:

- This occurs when a pulling force is applied to a material, causing it to elongate (expand).
- **Examples:**
 - Pulling a wire.
 - Spider web stretch.
 - Bridge cables under tension (Like Sukkur-Rohri Bridge/Ayoub Pull)



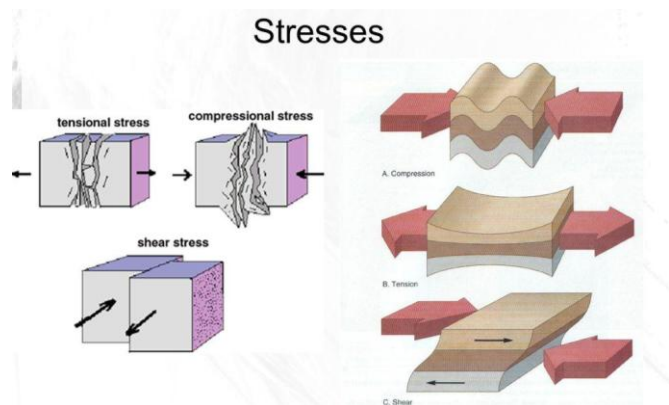
2. Compressive Deformation:

- This occurs when a **pushing force** is applied to a material, causing it to compress or contract.
- **Example:** Crushing a can, compressing a spring, compression of soil under heavy force



3. Shear Deformation:

- This occurs when a shearing force causes a change in the shape of an object without changing its length.
- Shearing deformation consists of both tensile and compressive forces.
- **Examples:**
 - Sliding deformation due to force parallel to the surface.
 - Cutting with scissors.
 - Sandpaper motion.



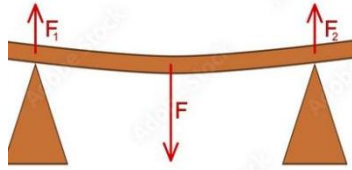
- **Fixed Base:** Shear force applied from one edge.
- Movement occurs parallel to the surface.
- Volume remains constant; only shape changes.
- **Note:** Shear length shortens as one edge moves opposite.

4. Bending Deformation:

- This occurs when force is applied perpendicular to the surface, and the solid object curves.

- **Example:**

- When a straight beam made of a homogeneous material is subjected to bending.



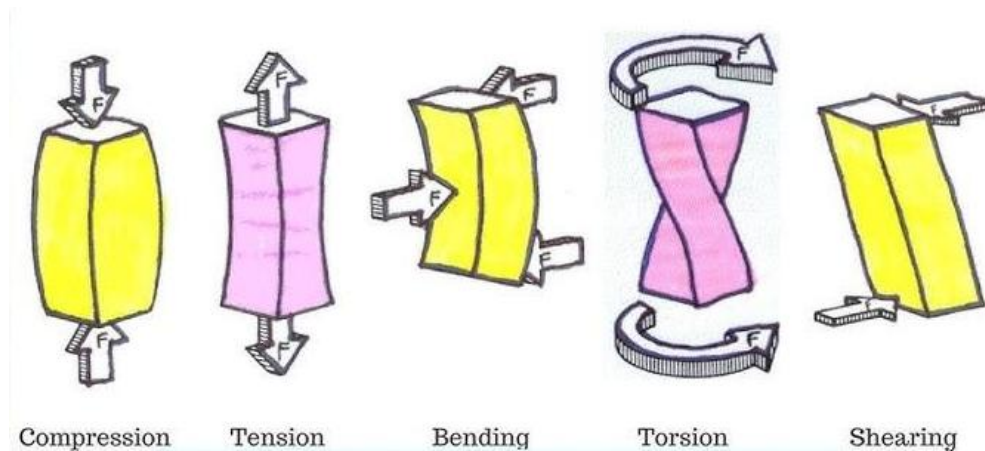
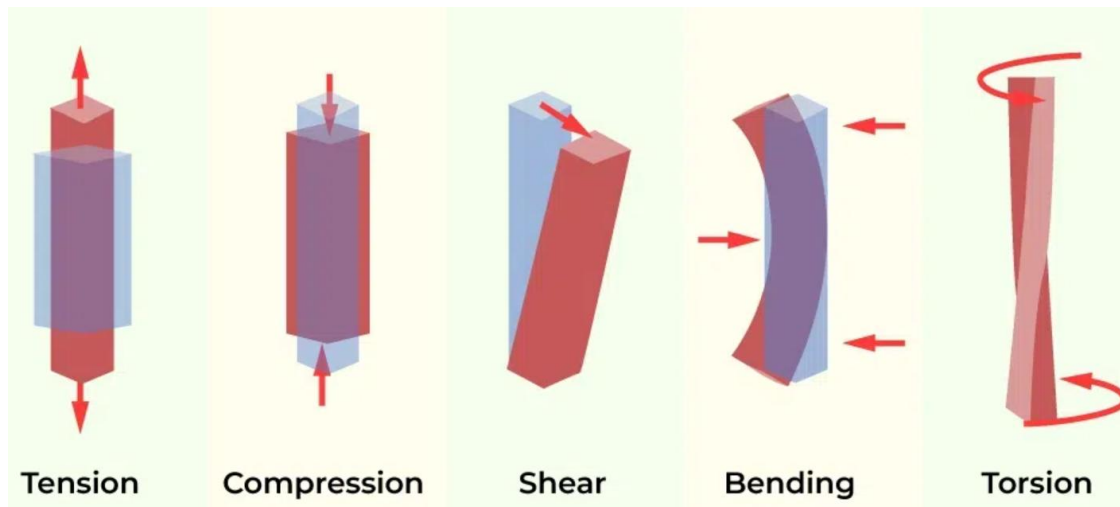
5. Torsional Deformation:

- This occurs when rotational force is applied, and the solid object twists.

- **Examples:**

- Twisting a rope.
- Torsion in fan blades.
- Twisting a wire.
- Torsion in a screwdriver.





Types/Modes of Deformation Based on Material Behavior:

1. Ductile Deformation:

- Permanent deformation without breaking, resulting in a change in shape.
- **Example:**
 - A ductile medium is able to retain its shape without cracking or breaking.
 - Examples: Copper wire, aluminum foil, gold leaf, tin, silver wire.

2. Brittle Deformation:

- Sudden breaking or shattering without significant deformation.
- **Examples:**
 - Glass rod breaking into pieces.
 - Concrete beams.

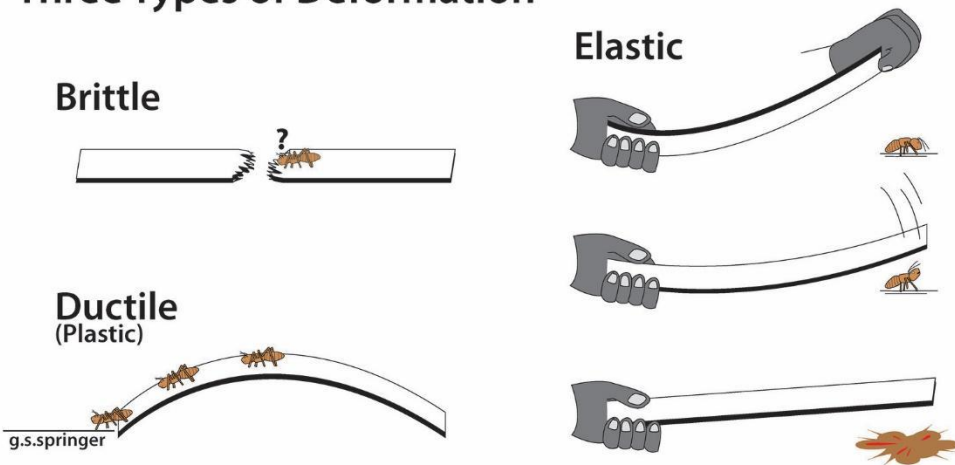
- Stone columns.

3. Fatigue Deformation:

- Gradual degradation of a material due to repeated loading and unloading cycles.
- **Examples:**
 - Bicycle chain fatigue.
 - Bridge collapse due to fatigue.
 - Airplane engine crankshaft.



Three Types of Deformation



Lecture: 04

Topic: Deformation in one dimension (1D) - Stress and Strain

Deformation in one dimension:

- **Definition:** The change in the length of an object when a force pulls or pushes it in one direction.

Deformation in 1D

Stress:

- **Cause of Deformation**
- **Definition:** Stress is the force applied per unit area that causes deformation.

Formula: Stress = Force / Area

- **Unit:** Pascal (Pa) or Newton/m² (N/m²)

Stress Types:

1. Tensile Stress:

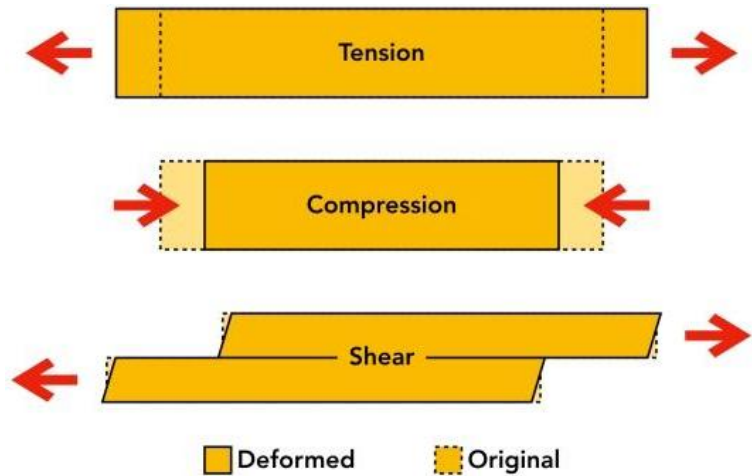
- When a pulling force stretches an object, increasing its length.
- Example: Stretching a spring.

2. Compressive Stress:

- When a pushing force squeezes (compresses) an object to decrease its length.
- Example: Squeezing a rubber.

3. Shear Stress:

- When force acts parallel to a surface in opposite directions, causing the material to slide or deform.
- Example: Sliding blocks.



Strain:

- **Definition:** Strain measures the deformation caused by stress.
- **Formula:** Strain = Change in Length / Original Length
- **Unit:** Strain is unitless (a dimensionless quantity).
- **Example:**
 - A rubber band of length 20 cm is stretched to 25 cm.
Change in Length (ΔL) = 25 - 20 = 5 cm.
Strain = $\Delta L / L_0 = 5 / 20 = 0.25$.

Note:

- **The greater the stress, the greater the strain** when there is the same kind of material.
-

Mechanical Properties: Stress and Strain

- **Relationship:** Stress is proportional to strain and depends on the Elastic Modulus of an object.
- **Formula:** $\text{Stress} = \text{Elastic Modulus} \times \text{Strain}$
 - **Elastic Modulus (E):** It is a measure of the stiffness of a material.

Key Points:

- Steel wire > Spring > Rubber.
- Small E = Deform easily.
- Large E = Rigid Material.

Examples of E:

- Rubber: Deforms easily.
- Steel wire: Strong and rigid.

Lecture: 05

Topic: Mechanical Properties of Solids

- **Definition:**
Mechanical properties of solids are the characteristics that describe how a solid material responds to applied force or deformation.
 - **Some important mechanical properties of solids are:**
 - Elasticity
 - Ductility
 - Brittleness
 - Hardness
-

Topic: Young's Modulus (Modulus of Elasticity)

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Class 11 Physics notes

Numericals:

1. A car mechanic applies a force of 800 N to a wrench for the purpose of loosening a bolt. He applies the force which is perpendicular to the arm of the wrench. The distance from the bolt to the mechanic's hand is 0.40 m . Find out the magnitude of the torque applied? **(320 N.m)**

Data

$$F = 800\text{ N}$$

$$r = 0.40\text{ m}$$

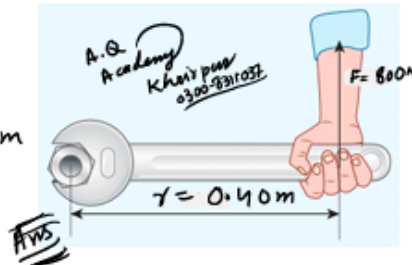
$$T = ?$$

Solution

$$\therefore T = \vec{F} \times \vec{r}$$

$$T = 800 \times 0.40\text{ m}$$

$$T = 320\text{ N.m}$$

Numerical-2

2. A car accelerates uniformly from rest and reaches a speed of 22 m/s in 9 s . If the diameter of a tire is 58 cm , find
- the number of revolutions the tire makes during this motion, assuming no slipping, and
 - the final rotational speed of the tire in revolutions per second. **(55 rev, 12 rad/s)**

Data

$$V_i = 0$$

$$V_f = 22\text{ m/s}$$

$$t = 9\text{ second}$$

$$\text{diameter} = d = 58\text{ cm} \Rightarrow \frac{58}{100} = 0.58\text{ m}$$

$$\text{now } r = \frac{d}{2} = \frac{0.58}{2} = 0.29\text{ m}$$

① number of revolutions = $N = ?$

② Revolution per second rps = ?
— solution —

③ Number of revolutions = $N = ?$
formula :-

$$\text{Number of revolutions} = \frac{\text{Distance travelled}}{\text{Circumference of tire}}$$

$$N = \frac{S}{2\pi r}$$

but we don't know about $S = ?$

so to find distance take

Third solution is motion

$$S = \frac{1}{2} a t^2$$

$$\therefore a = \frac{V_f - V_i}{t}$$

$$S = \frac{1}{2} \left[\frac{V_f - V_i}{t} \right] \times 81$$

$$S = 0.5 \left(\frac{22 - 0}{9} \right) \times 81$$

$$S = 0.5 \left(\frac{22}{9} \right) \times 81$$

$$S = 0.5 \times 22 \times 9$$

$$S = 99\text{ m}$$

Now put in
This formula

$$\therefore N = \frac{S}{C}$$

$$\therefore \text{circumference of circle}$$

$$C = 2\pi r$$

یہاں دیکھو
99m
اس کا جواب
سارا دیکھو
اس کا جواب
یہی ہے
اور نہ کو غلط
ہوگا

Numerical-3

3. An ordinary workshop grindstone has a radius of 7.5 cm and rotates 6500 rev/min.
- (a) Calculate the magnitude of centripetal acceleration at its edge in m/s^2 and convert it into multiples of g .
- (b) What is the linear speed of a point on its edge?

($3.47 \times 10^4 \text{ m/s}^2$, $3.55 \times 10^3 g$, 51 m/s)

Data:-

$$r = 7.5 \text{ cm} = \frac{7.5}{100} = 0.075 \text{ m}$$

$$\omega = 6500 \text{ rev/min} \Rightarrow \text{convert to rad/s} \Rightarrow \frac{6500 \text{ rev}}{\text{min}} \times \left(\frac{2\pi \text{ rad}}{1 \text{ rev}} \right) \times \left(\frac{1 \text{ min}}{60 \text{ s}} \right)$$
$$\Rightarrow \frac{6500 \times 2\pi \text{ rad}}{60 \text{ s}}$$

$$\omega = \frac{6500 \times 2 \times 3.14 \text{ rad}}{60 \text{ s}}$$

$$\omega = \frac{40840 \text{ rad}}{60 \text{ s}}$$

$$\omega = 680.3 \text{ rad/s}$$

- (a) $a_c = ?$
 a_c in multiples of gravity?

- (b) linear speed = $V = ?$

Solution

First find (b) part of question

$$V = ?$$

we know that

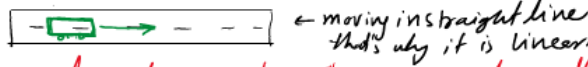
$$a_c = \frac{51 \times 51}{0.075}$$

$$a_c = \frac{2601}{0.075}$$

Kinematics of Angular Motion

Motion: If a body changes its position and move from one point to other is said to be in motion.

Linear motion: If a body changes its position on linear path.



Angular Motion: If a body changes its position on circular path or curved path and move from one point of circle to other point of circle/curve then it is called circular motion.



This circular or rotatory motion makes angle during their path that's why we call it "Angular motion".

Kinematics :- Kinematics is the field which

study about the motion of bodies without knowing the cause of motion.

but Motion may be linear motion or, angular motion.

Kinematics of linear motion: The field which study the motion of bodies in linear path, known as kinematics of linear motion.

Kinematics of Angular motion: The field which study the motion of bodies in circle or angular path known as kinematics of angular motion.

This field also help us to study angular displacement,

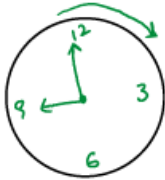
Right-hand ^{for} angular quantities rule

وہ چیزیں جو سرکل میں گھومیں یا اپنے ارد گرد پھریں
ان میں یہ طرف ہیں ہوتے

North, south, East, West

باقی ان کے لیے دو طرف ہوتے ہیں وہ ہیں

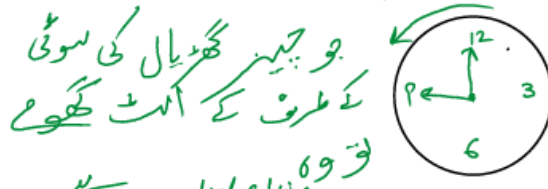
(i) clockwise direction (ii) Anticlockwise direction / counter-clockwise



جو چیز گھڑیال کی
سوئی کے طرف کی طرح
گھومے تو وہ

clockwise ہے

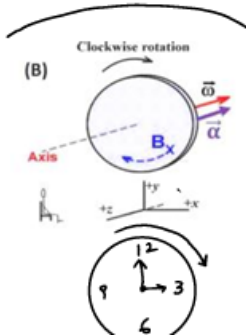
گھڑیال کی سوئی 12 سے 1 سے 3 بجے
جیسے طرف میں جائے تو وہ کلاں دائرہ ہے



جو چیز گھڑیال کی سوئی
کے طرف کے آگے گھومے
تو وہ anticlockwise ہے

گھڑیال کی سوئی اگر الٹی چلے جیسے 12 سے 11 اور پھر
11 سے 10 طرف تو وہ anticlockwise ہے

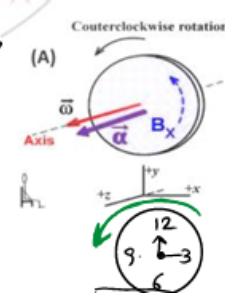
$\Rightarrow$ angular velocity can be clockwise or anticlockwise direction.



Suppose this is a circular disk rotating in clockwise direction

so Angular momentum

Suppose this is also a circular disk rotating in anticlockwise or counter clockwise direction
so



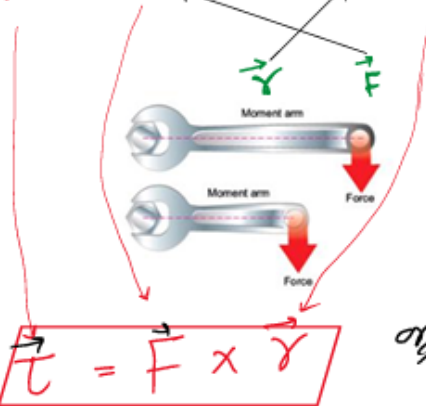
Torque

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Torque:- Torque is the turning effect of the force about the axis of rotation is called torque.

⇒ Torque is also known as "moment of force"

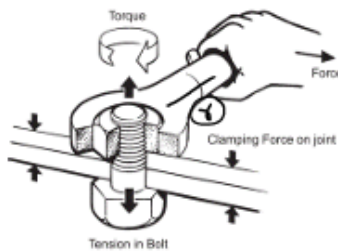
Torque = Force × Moment arm



Torque:- It is the product of force ($\vec{F}$) and moment arm ($\vec{r}$)

or magnitude

$$\tau = Fr \sin \theta \quad \text{or} \quad \tau = F(r \sin \theta)$$



↖ You can see when force (F) is applied on moment arm (r) then it is turning.

so, This turning effect due to force is called Torque.

⇒ So, if anything rotates, it do not rotates in North, East, West or, South but it rotates in two ways

i) clockwise

ii) Anti-clockwise

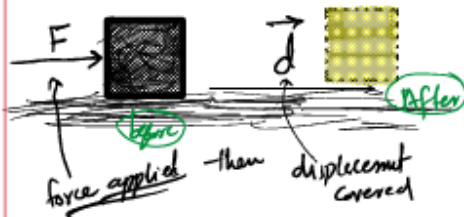
→ If anything rotates like the direction of needle in wall clock

→ If anything rotates opposite to the direction of needle of wall clock then it is anticlockwise.

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Work (W):

When you apply force on object and it cover some distance, then it is called "Work"

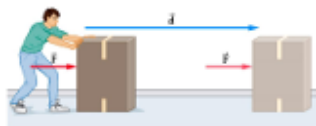


⇒ It means that we can say work is product of force and displacement.



Work Done by a Constant Force

The definition of work



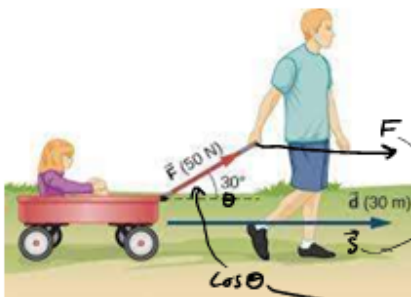
Therefore,

$$\text{work} = \text{Force} \times \text{Displacement}$$

$$W = \vec{F} \cdot \vec{d}$$

Work is the dot product of force and displacement.

displacement is shown with $\vec{d}$ sometimes displacement is shown with $\vec{s}$



$$W = \vec{F} \cdot \vec{s}$$

dot product of two vectors take the $\cos \theta$

$$W = \vec{F} \cdot \vec{s} \cos \theta$$

work is scalar product.

units: S.I unit of work is Joule

$$\text{Joule} = \text{Newton} \times \text{meter}$$

$$J = N \times m$$

Types of work :-

Ⓐ Positive work: If the force ($\vec{F}$) applied on body and it	Ⓑ Negative work If Force ($\vec{F}$) is applied on body and it	Ⓒ Zero work If the Force ($\vec{F}$) is applied on body and it do not
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Calculate the work done by force-displacement graph

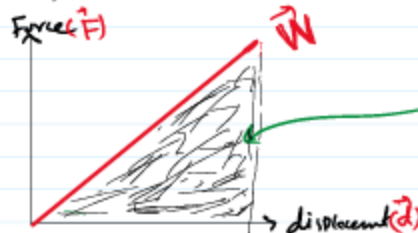
Tuesday, November 21, 2023 1:52 AM

To calculate the work done by force-displacement graph we need to find the area under the graph.

⇒ The area of the graph gives the magnitude of work done.

⇒ The graph which represent "work" with the help of "force" and displacement is known as force-displacement graph.

Example



Here the area under the curve will give us the amount of work done

Now find work from the force-displacement graphs.

There are two types of force-displacement graphs to find work

① Graph is a straight line

If the graph is straight line the work done can be found by the same formula

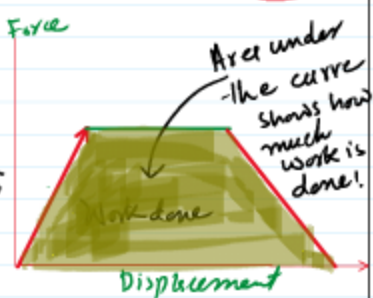
$$\text{work} = \text{Force} \times \text{displacement}$$

$$W = F \cdot d$$



② Graph is not a straight line

اگر ایک گراف کا کرافٹ
ہو تو اس کا درجہ
فرضاً $W = F \cdot d$ ہے
نہیں ہوگا۔

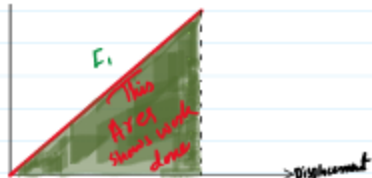


If the force-displacement graph of work is not a straight line as in figure

⇒ then we have to break figure in small shapes such as "Rectangles" and "Triangles" to calculate area of each shape separately

Now we can see here that there are three





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Now we can see here
that there are three
areas

Area I, Area II, Area III

⇒ from which two area of triangle
and one area is Rectangle

Now, to find work, Area of all
triangles and rectangle is to
be found.

⇒ To find area of triangle we know from math
we have

$$A = \frac{1}{2} \times \text{Base} \times \text{height}$$

$$A = \frac{1}{2} \times F \cdot d$$

$$\begin{aligned} \Delta \text{ Area} &= \frac{1}{2} \times \text{Base} \times \text{height} \\ \therefore A &= \frac{1}{2} b \times h \end{aligned}$$

⇒ To find area of rectangle we have
same formula

$$A = \text{Force} \times \text{displacement} \quad A = L \times W$$

$$A = F \cdot d$$

To get total work we add total
areas.

$$\text{work done} = \text{Area I} + \text{Area II} + \text{Area III}$$

$$\text{Work done} = \text{Area of triangle} + \text{Area of Rectangle} + \text{Area of triangle}$$

$$= \frac{1}{2} \times F \cdot d + F \cdot d + \frac{1}{2} F \cdot d$$

In this way we can calculate the work of
graphs which are not straight line.

Solve related
worksheet
Example 5.2

Worked Example 5.4

A person riding their bike has a mass of 120 kg; they are riding at 10m/s. suddenly a dog crosses the road and to avoid hitting the dog the bicyclist brakes applying a braking force of 500 N for a distance of 10 meters. What is the final velocity of the bicyclist when they stop braking?

Data:

mass of riding bike $\rightarrow m = 120 \text{ kg}$
 initial velocity $\rightarrow V_i = 10 \text{ m/s}$
 Force $\rightarrow F = 500 \text{ N}$
 distance $\rightarrow d = 10 \text{ m}$
 final velocity $\rightarrow V_f = ?$

Solution

Step-1 = Find Work

Work = Force $\times$ displacement

$$W = 500 \times 10$$

$$W = 5000 \text{ J}$$

work is done on exerting brake on car, so work would be called negative work, that's why its value would be written in negative sign.

so

$$W = -5000 \text{ J}$$

Step-2 = Calculate the initial energy of object:

$$\therefore K.E = \frac{1}{2} m V^2$$

$$\therefore K.E = (K.E)_{\text{initial}} \quad \therefore V = V_i$$

$$K.E_{\text{initial}} = \frac{1}{2} m V_i^2$$

$$K.E_{\text{initial}} = \frac{1}{2} (120) (10)^2$$

$$= \frac{1}{2} \times 120 \times 100$$

$$= \frac{1}{2} \times 12000$$

$$K.E_{\text{initial}} = 6000 \text{ J}$$

Step-3 find final kinetic energy = ?

$$(K.E)_{\text{final}} = (K.E)_{\text{initial}} + \text{Work done}$$

$$= 6000 \text{ J} + (-5000 \text{ J})$$

$$= 6000 \text{ J} - 5000 \text{ J}$$

$$(K.E)_{\text{final}} = 1000 \text{ J}$$

Step-4 Find the final velocity V_f ?

For V_f use $(K.E)_{\text{final}}$

$$\therefore K.E = \frac{1}{2} m V^2$$

$$(K.E)_{\text{final}} = \frac{1}{2} m V_f^2$$

$$1000 \text{ J} = \frac{1}{2} \times 120 \times V_f^2$$

$$\frac{1000 \times 2}{120} = V_f^2$$

$$\frac{2000}{120} = V_f^2$$

$$\frac{200}{12} = V_f^2$$

$$16.66 = V_f^2$$

$$\sqrt{16.66} = V_f$$

$$4.08 = V_f$$

$$\therefore V_f = 4.08 \text{ m/s}$$

Ans.

Fluid Statics :- It is the study of behaviour of fluids in state of rest.

Practical applications in various fields:

→ Civil Engineering, Naval architecture, Petroleum Engineering
Aerospace Engineering, Biomedical Engineering.

Pascal's Law :- "Pressure applied at any point of container filled with fluid, transmit pressure to all directions."

⇒ Force applied externally at any point of a liquid enclosed in a container is transmitted equally to all directions.

⇒ When a change in pressure is applied at any point to any static fluid, it is transmitted perfectly to all the walls of container.



(as in the figure)

اگر آپ اس کنٹینر کی کسی ایک پوائنٹ پر پریشر لگائیں گے تو وہ پریشر سارے اطراف میں ایک جتنا منتقل ہو جائے گا۔
تو اس کو ہم پاسکل کا قانون کہتے ہیں۔

اگر آپ نے اس جگہ SN فورس لگائی تو وہ SN فورس ہر جگہ لگے گی یعنی اس کو ہر پوائنٹ پر SN فورس لگے گی۔

Examples. ① As you squeeze tooth paste at one end the same is transmitted to the opening of tube.

آپ ٹوٹھ پیسٹ کی کسی ایک جگہ پے پریشر دیتے ہیں تو وہ پریشر ہر جگہ پے لگے اور آکر اس میں سے پیسٹ کو نکالے گا۔

② Hydraulic machine, Hydraulic brakes, hydraulic jacks, all uses pascal's Law.



Hydraulic Machine

Physics in History

آرکمیڈیز پرنسپل کو پڑھنے سے پہلے اس کی کھڑی کہانی ہم پڑھتے ہیں۔
یہ شخص حضرت عیسیٰؑ سے 287 سال پہلے پیدا ہوا۔

اور حضرت عیسیٰؑ سے 212 سال پہلے ہی فوت ہوا۔

اس زمانے میں اس شخص کو یہ ایک کام بادشاہ وقت کی طرف سے دیا گیا کہ وہ "یہ جان کے بتائے کہ ان کا جو crown یعنی تاج ہے وہ اصلی سونے کا بنا ہے یا نقل ہے۔

جب وہ اپنے Syracuse علاقے میں جو عوام کے حمام یعنی نہانے کے Pools تھے ان میں نہانے کے لیے گیا

اور اس نے اچانک دیکھا کہ پانی کی لیول بڑھ جاتی ہے جب کوئی بندہ اس حمام یعنی Pool میں آتا ہے۔

اس بات سے اس کو جواب مل چکا تھا جو اس کے داغ میں تھا۔ مگر تاج خدانے بتاتے ہیں اس چیز کو جاننے کے بعد آرکمیڈیز شہر کی گلیوں میں بچوں کی طرح بھاگ بھی رہا تھا اور

Write Eureka moment again. Form not

ساکھتا تھا "Eureka! Eureka! Eureka!"

جس کا انگریزی میں ترجمہ ہے "I have found it" اور

اردو میں اس کا مطلب ہے پانے پانے مرنے مرنے میں نے ڈھونڈ لیا!

اب ہم نے دیکھنے جارہے ہیں کہ وہ کیا چیز تھی جو اس بندے نے ڈھونڈی اور آرکمیڈیز اصول بھی آرکمیڈیز پرنسپل کے طور پر ناما رے کتب میں کچھ تک شائع ہے۔

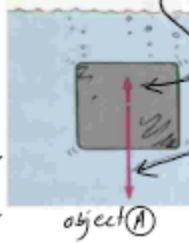
Archimedes' Principle :-

It states that "When an object is immersed into a liquid, it experiences upward thrust (force) and it is equal to weight of liquid displaced."

Law of floatation:

اب اگر آپ سے ایک سول ہوا جانا کہ کیوں ایک چھوٹا سا لوہے کا ٹکڑا ہائی میں ڈوب جاتا ہے مگر اسی لوہے کے بنے بڑے بڑے بحری جہاز ہائی میں تیر رہے ہیں؟

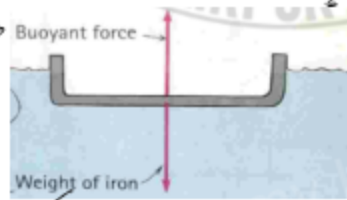
① فرض کریں ایک لوہے کا ٹکڑا جو آپ نے لیا ہے اب اس کا ایریا کم ہے
 یعنی یہ ہائی کو $displace$ بھی کم کر رہا ہے۔
 جس کی وجہ ہائی اس کو اوپر $Buoyant$ کم بھجائے کے لیے کم دے گا۔
 weight is more concentrated and exerting more force downward.



اب آپ نے سنا ہوگا نہ پھیٹر ملنگا ٹوٹا!

مگر یہاں پھیٹرنا ($displace$) کرنے میں ہی فائدہ ہے۔

بعد میں ہم نے یہ کیا کہ سیم ($object A$) والے لوہے کے ٹکڑے کو $reshape$ کر کے / تبدیل کر کے اسی ایک bowl جیسا بنادیا ہے۔
 اب یہاں یہ ہوگا وہی لوہا جس کی $shape$ تبدیل ہونے سے اس کے اوپر نیچے سے اوپر کی طرف $Buoyant$ زیادہ لگے گی جس کی وجہ سے اب یہ $float$ سیم لوہے کا بنا $float$ ہوگا۔
 وہ ہائی کو $displace$ زیادہ کر رہا تھا جس کی وجہ سے اب $float$ کر رہا ہے۔



⇒ The deeper the object immerse, the more water it displaces, and greater buoyant force would

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Ans



D

width = $W = 30\text{ft}$

length = $L = 85\text{ft}$

Depth = $d = h = 15\text{ft}$

(a) How many m^3 of water will displace = Volume = $V = ?$

when the top stays 1m above the water?

so $h = 1\text{m}$

convert it into feet.

$$\therefore 1\text{m} = \underline{3.28 \text{ feet}}_{\text{m}}$$

$$h = 1\text{m} \times 3.28 \frac{\text{feet}}{\text{m}}$$
$$= 1 \times 3.28 \text{ feet}$$

$$\boxed{h = 3.2 \text{ feet}}$$

⑥ What load in tons will the barge contain under these conditions

means: weight = W = ?

→ if the empty barge weighs = W = 160 tons.

Solution

① Volume = ?

یہاں ہم نے وہ والیوم معلوم کرنا ہے۔
بارجے 3.28 میٹر سے زیادہ ڈیپٹی ہوگا۔
displace ہوگا

Barge =
بیٹری
small ship

اور بیڑی جانے کے بعد ہائی 1m اوپر
آجاتا ہے تو مطلب ہم نے والیو $h=1m$ کے
صاف سے معلوم کرنا -

$$V = l \times w \times h$$

مگر یہاں l, w سب ft و h unit میں ملی
ہوئے ہیں تو جو h ہمیں 1m میں ملی ہوئے ہے
اس کو ہم convert کریں گے ft میں بھی ہم والیو
کے فارمولے میں put کریں گے - $h = 1m$

$$h = 1 \times 3.28 ft$$

$$h = 3.28 ft \checkmark$$



اب یہاں یہ چیز پتھوڑی کچھ لیں کہ اصل جو height
ہے بیڑی کی وہ ہے $h = 15 ft$

اب اس بیڑی کی height میں سے $h = 1m$

- subtract 3.28 ft from 15 ft

so

$$h = 15 \text{ ft} - 3.28 \text{ ft}$$

$$h = 11.72 \text{ ft}$$

Now

Submerged volume / Displaced volume.

$$\begin{aligned} V &= l \times w \times h \\ &= 30 \text{ ft} \times 85 \text{ ft} \times 11.72 \text{ ft} \\ &= 29,886 \text{ ft}^3 \\ &= 2.9886 \times 10^4 \text{ ft}^3 \end{aligned}$$

$$V = 3 \times 10^4 \text{ ft}^3$$

Now How much weight (in tons) is displaced - $W = ?$
we know that

$$\therefore \text{Displaced weight} = \text{density of fluid} \times \text{Volume}$$

$$W = \rho \times V$$

$\therefore$ density of water

$$\therefore \rho = 62.4 \frac{\text{lb}}{\text{ft}^3}$$

$$W = 62.4 \frac{\text{lb}}{\text{ft}^3} \times 3 \times 10^4 \text{ ft}^3$$

$$W = 187.26 \times 10^4 \text{ lb}$$

$$W = 1872600 \text{ lb}$$

convert pound (lb) to tons

$$1 \text{ ton} = 2000 \text{ lb}$$

$$W = \frac{1872600}{2000} \text{ tons}$$

$$W = 936.3 \text{ tons}$$

But we know that empty barge is = 160 tons
 $\therefore W = 160 \text{ tons}$

$$\rho = 1000 \text{ kg/m}^3$$

convert into lb/ft^3

$$1 \text{ kg} = 2.2046 \text{ lb}$$

$$1 \text{ m}^3 = 35.314 \text{ ft}^3$$

$$\rho = \frac{1000 \times 2.2046}{35.314}$$

$$\rho = 62.42 \frac{\text{lb}}{\text{ft}^3}$$

$$W = 936.3 \text{ tons} - 160 \text{ tons}$$

$$W = 776.3 \text{ tons}$$

(in Book Ans: 800 tons)
Ans $\rightarrow$ (Acc: to del 776.3 tons)
is more precise

This is the weight displaced.

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Chapter 7 Fluid dynamics

Introduction:

- ہم روزمرہ کی زندگی میں fluids کا موشن دیکھتے رہتے ہیں
- مثال کے طور پر gases یا liquids کا چھوٹے اور بڑے پائپ سے گزراؤ وغیرہ
- مثال کے طور پر ہمارے جسم میں خون کی نالیوں veins میں خون کا بہنا یا پھر نالی میں ہانی کا جانا یا آنا وغیرہ
- یا پھر یہ سوال کہ کیوں دھواں ہمیشہ اسٹین بنا کے اوپری طرف ^{twist} کھینچا جاتا ہے؟
- کس طرح علاقہ $hazard$ ہانی کی ایسیڈ کو فی اور کم کثرت ہے؟
- کیسے ہمارے جسم کا خون ہمارے پیہ ایون سے آج تک ہماری رگوں میں دوڑ رہا ہے؟
- ان سب سوال اور سب چیزوں کو ہم study کریں گے fluid dynamics کے اندر۔

→ when a fluid is in motion or, an object moves through fluid (like aeroplane or ship), the pressure within fluid varies with velocity.

جب fluid موشن میں ہو یا آبجیکٹ move کرے fluid کے اندر،
(جیسے جہاز یا بیڑی) تو fluid کے اندر ولوسٹی کے حساب سے پریشر کا difference ہوتا رہتا ہے۔

→ when a fluid is in motion or, an object moves through fluid (like aeroplane or ship), the pressure within fluid varies with velocity.

جب fluid حوشن میں ہو یا آبجیکٹ move کرے fluid کے اندر،
(جیسے جہاز یا بیڑی)، تو fluid کے اندر ولوسٹی کے حساب سے پریشر کا
difference ہوتا رہتا ہے۔

اب یہ جو فورس ہے جو پریشر کے difference کی وجہ سے پیدا ہو رہی
ہے اس کو پہلی مرتبہ جس بند نے discover کیا تھا اس کا
نام مبارک "Gustav Magnus" تھا اور وہ ایک جرمن physicist تھے
انہوں نے 1852ء میں کیا تھا۔
اس بند نے ہمیں یہ بتایا کہ

→ why projectiles spinning about an axis other than their
direction of motion will curve from their actual
direction. ☺

→ Such spinning is technically performed by spinner bowlers
during swing of bowl in cricket.

→ Aerodynamics (fluid dynamics) is used in throwing or
kicking the ball in cricket and football etc.

→ کہ کیوں جو وہ بال جس کا اپنا ڈائریکشن تو ایک طرف ہے مگر

2. Viscous force in a fluid

Wednesday, April 17, 2024 11:39 PM

سائل کی لہریں (layers) کے درمیان

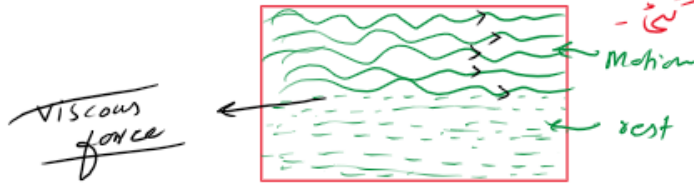
⇒ Viscous force is the opposition between layers of fluid.

$$[\text{Viscous force in a fluid}] \propto [\text{Rate of change of velocity of fluid layers}]$$

Where "Viscosity of fluid" is constant.

Viscous فورس دراصل fluid کی اپنی layers/سطحوں میں opposition کی وجہ سے وجود میں آتی ہے۔ دیکھیں!

پانی اگر کسی برتن میں ہے تو اس کو بھی سطحیں ہوتی ہیں جیسے ایک پانی کی سطح نیچے لیتے ہیں ہے جو ہتھ کے rest میں ہوتی کی وجہ سے پانی بھی کم move کر رہا ہے۔ اور اوپر والی پانی کی لہر move کر رہی ہے۔ اب یہ ہوگا کہ اوپر والی پانی کی سطح جب move کرے گی تو نیچے والی پانی کی سطح اس کو روکنے کی کوشش کرے گی اور یہی روکنا یعنی opposition بعد میں viscosity force کے نام سے ظاہر میں جانی گئی۔



4. Types of fluids flow

Friday, April 19, 2024 8:58 PM

Fluids in motion :-

→ As we see, fluid can move or flow in many ways. fluid کو ہم مختلف طریقوں سے بہتے ہوئے دیکھتے ہیں۔

→ Water may flow smoothly or slowly in a quiet stream.

یا آغائر یک خاموش ندی میں ہے تو وہ آرام سے بہہ گا۔

→ Water may flow violently or fast in a waterfall.

یا تیز بہتی ہے جیسا کہ آگرم اس کو آبشار میں دیکھیں گے تو۔

→ The air blows sometimes slowly such as breeze and sometimes it forms tornado

کبھی تو ہوا بڑے کون اور تیزی کے ساتھ لگتی ہے اور کبھی تو وہ طوفان کھڑا کر کے دیتا ہے۔

→ ہم fluid کے flow ہونے کے مختلف اقسام دیکھیں گے اور ان کے بارے میں سمجھیں گے۔

Two Main Types of fluid:- ① Steady flow ② unsteady flow.

① Steady flow: when fluid flows with constant velocity w.r.t time, such flow of fluids is called steady flow.

∴ In steady flow, the velocity of the fluid particles at any instant is constant as time passes.

→ Every particle of fluid passing from any given time through any point has the same velocity.

Transition from Laminar to Turbulent flow

Transition means changing from one state to another state.

or Transition from one type of flow to another type of flow.
Such as: Changing of laminar flow to turbulent flow.

Laminar flow

Laminar flows are smooth and streamlined.

→ Laminar flow is quiet and slow moving water in a straight direct line within parallel layers.

Laminar flow



LAMINAR FLOW



⇒ Laminar flow is smooth, ordered and occurs in layers without any much/significant mixing or swirling.

Turbulent flow

Turbulent flows are irregular, disordered and chaotic.

→ Turbulent flow is louder and faster moving water in a chaotic and disordered manner and mix b/w its parallel layers.

Turbulent flow



TURBULENT FLOW



⇒ Turbulent flow is chaotic and irregular movement of fluid particles, resulting in whirlpool, fluctuations in velocities and pressure.

Bernoulli's Principle : It is a fundamental principle in fluid dynamics that relates the pressure and velocity of a fluid in motion.

⇒ It states that total energy of a fluid remains constant along a streamline.

⇒ Bernoulli's principle is a key concept in fluid dynamics that relates pressure, speed and height.

⇒ It states that an increase in the speed of fluid occurs simultaneously with a decrease in either pressure or height.

⇒ Bernoulli's Equation deals with

- Energy Conservation law
- for Steady-state flow of
- incompressible fluids
- such as water.

⇒ It shows or relates the energy of fluids in terms of

- pressure
- velocity
- height.

⇒ Bernoulli's Equation can be derived from Law of conservation of energy.

⇒ According to Law of conservation of energy: "Energy can

neither be created nor destroyed."

⇒ Therefore, during streamline flow, the total mechanical energy remains constant

Assumptions: to derive equations

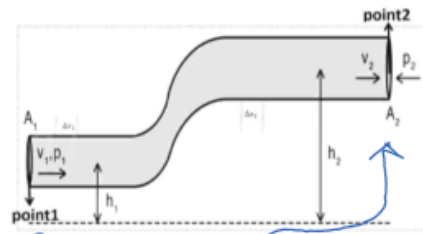
→ The flow must be steady and streamline.

→ The fluid is incompressible as the density should remain constant at all points during the flow.

⇒ There are no viscous

forces in fluid and friction is negligible.

⇒ Consider pipe whose diameter and elevation (in terms of height) changes as fluid passes through it.



⇒ Now consider a small mass of fluid which has density " ρ " flows from point-1 to point-2.

⇒ When this water moves from point-1 to point-2, the work is done on fluid.

⇒ Work is done by force " F " on the fluid to displace (move) fluid (mass) from point-1 to point-2 by covering distance of Δx .

$$\Delta W = \Delta W_1 - \Delta W_2$$

$$\Delta W = F_1 \Delta x_1 - F_2 \Delta x_2 \rightarrow (1)$$

we know that the force is the product of pressure & Area.
we know that

$$\therefore P = \frac{F}{A}$$

$$\therefore PA = F$$

$$\therefore \sigma F = PA$$

Put in eq (1)

$$\Delta W = P_1 A_1 \Delta x_1 - P_2 A_2 \Delta x_2 \rightarrow (2)$$

$$\therefore V = l \times w \times h$$

$$V = l \times A \quad \therefore l = \Delta x$$

$$V = \Delta x \times A$$

$$\therefore \Delta V = A \Delta x \rightarrow (3)$$

Put in eq (2)

$$\Delta W = P_1 \Delta V - P_2 \Delta V$$

ΔV is common

4. Water circulates throughout a house in a hot-water heating system. If the water is pumped at a speed of 0.50 m/s through a 4.0 cm diameter pipe in the basement under a pressure of 3.0 atm, what will be the flow speed and pressure in a 2.6 cm diameter pipe on the second floor 5.0 m above? Assume the pipes do not divide into branches.

(1.2 m/s, 2.5 atm)

Data

$$v_1 = 0.50 \text{ m/s}$$

$$d_1 = 4.0 \text{ cm}$$

$$d_1 = 0.04 \text{ m}$$

height at
basement $\Rightarrow h_1 = 0 \text{ m}$

$$P_1 = 3.0 \text{ atm}$$

convert to pascals

$$P_1 = 3 \times 1.013 \times 10^5 = 3.039 \times 10^5 \text{ Pa}$$

$$d_2 = 2.6 \text{ cm}$$

$$= 2.6 \div 100 \text{ m}$$

$$d_2 = 0.026 \text{ m}$$

$$r_1 = \frac{d_1}{2}$$

$$r_1 = \frac{0.04}{2}$$

$$r_1 = 0.02 \text{ m}$$

$$r_2 = \frac{d_2}{2}$$

$$r_2 = \frac{0.026}{2}$$

$$r_2 = 0.013 \text{ m}$$

height of
second floor
 $h_2 = 5 \text{ m}$

$$\textcircled{a} \quad v_2 = ?$$

$$\textcircled{b} \quad P_2 = ?$$

Solution

To find their velocity we need Area

Step 1

Find Area of pipe

$\Rightarrow$ Pipe is spherical so formula to find area is

$$A_1 = \pi r_1^2$$

$$A_2 = \pi r_2^2$$

$$A_1 = 3.14 \times (0.02)^2$$

$$= 3.14 \times 0.0004$$

$$A_1 = 0.001256 \text{ m}^2$$

$$A_2 = 3.14 \times (0.013)^2$$

$$= 3.14 \times 0.000169$$

$$A_2 = 0.00053066 \text{ m}^2$$

Step 2 Now find velocity of $v_2 = ?$

According to continuity Equation.

$$A_1 v_1 = A_2 v_2$$

$$0.001256 \times 0.5 = 0.00053 \times v_2$$

$$0.000628 = 0.00053 \times v_2$$

$$\frac{0.000628}{0.00053} = v_2$$

$$1.183 \approx 1.2$$

Step 3 Now ⑥ Find 'P₂' using Bernoulli's Principle

$$\approx [V_2 = 1.2 \text{ m/s}]$$

According to Bernoulli's equation.

$$P_1 + \frac{1}{2} \rho V_1^2 + \rho g h_1 = P_2 + \frac{1}{2} \rho V_2^2 + \rho g h_2$$

To find P₂ move all terms to other side.

$$P_1 + \frac{1}{2} \rho V_1^2 - \frac{1}{2} \rho V_2^2 + \rho g h_1 - \rho g h_2 = P_2$$

Take some common.

$$P_1 + \frac{1}{2} \rho (V_1^2 - V_2^2) - \rho g (h_2 - h_1) = P_2$$

$$\approx P_1 + \frac{1}{2} \rho (V_1^2 - V_2^2) - \rho g (h_2 - h_1) = P_2 \quad \therefore g = 10$$

$$3.03 \times 10^5 + \frac{1}{2} \times 1000 [(0.5)^2 - (1.2)^2] - 1000 \times 10 [5 - 0] = P_2$$

$$3.03 \times 10^5 + 500 [0.25 - 1.44] - 1000 \times 10 \times 5 = P_2$$

$$3.03 \times 10^5 + 500 (-1.19) - 50000 = P_2$$

$$3.03 \times 10^5 - 595 - 50000 = P_2$$

$$303000 - 595 - 50000 = P_2$$

$$= 252405 = P_2$$

$$303000 - 50595 = P_2$$

$$252405 \text{ Pa} = P_2$$

$$\therefore P_2 = 252405 \text{ Pa} \quad \therefore P_2 = 2.5 \times 10^5$$

Convert pascals into atm

$$\therefore 1 \text{ atm} = 1.013 \times 10^5 \text{ Pa}$$

$$\therefore 1 \text{ atm} = 101300 \text{ Pa}$$

$$P_2 = \frac{252405}{101300}$$

$$P_2 = 2.45 \text{ atm}$$

$$\therefore P_2 = 2.5 \text{ atm}$$

Ans.

5. What is the volume rate of flow of water from a 1.85 cm diameter faucet if the pressure head is 12 m?

$$(4.6 \times 10^{-3} \text{ m}^3/\text{s})$$

Data

$$\text{Volume flow rate} = Q = \frac{\Delta V}{\Delta t} = ?$$

$$d = 1.85 \text{ cm} = \frac{1.85}{100}$$

$$= 0.0185 \text{ m}$$

$$r = \frac{d}{2} = \frac{0.0185}{2}$$

$$r = 0.00925 \text{ m}$$

Solution

Acc: to Equation of continuity

Volume flow rate = Area $\times$ velocity

$$Q \Rightarrow \frac{\Delta V}{\Delta t} = A \times v$$

But we don't know the velocity (v) and Area (A)



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SECTION- A (PROSE)

SECTION- a (PROSE)

uNIT:01 tRUST WORTHINESS AND TOLERANCE

Lesson 01: The DEVOTED FRIEND BY OSCAR WILD

Full Translation Video: <https://youtu.be/N-4OcVMdJP0?si=9PHkJcxuIoLJcvqx>

Full Solved Exercise Video: <https://youtu.be/jtNniSYoVVM?si=WEtI0z4fMOA9mEkJ>

Summary of lesson: (In English)

The story *The Devoted Friend* is about two characters, Little Hans and the Miller. Hans is a poor but kind-hearted gardener who works very hard. The Miller, on the other hand, is selfish and only pretends to be a good friend. He always talks about the beauty of friendship, but he never helps Hans in his difficult times. Instead, he takes advantage of Hans by making him do all kinds of work with the false promise of giving him a broken wheelbarrow.

Hans, being simple and trusting, always agrees to the Miller's demands. He sacrifices his own time, health, and garden to serve his so-called friend. At last, on a stormy night, the Miller sends Hans to fetch the doctor for his injured son. The weather is very bad, but Hans still goes to help. Unfortunately, he loses his way in the dark, falls into a pool of water, and dies.

The next day, everyone attends Hans' funeral, and the Miller pretends to be very sad. However, he still thinks only about his wheelbarrow instead of Hans' death. The story teaches us that false friends are dangerous. They only use others for their own benefit, while true friendship is based on care, honesty, and loyalty.

Summary of lesson: (In Urdu)

خلاصہ:

یہ کہانی ایک غریب مالی "لٹل ہانس" اور ایک امیر چکی والے "ملر" کے بارے میں ہے۔ ہانس ایک نیک، محنتی اور سیدھا سادہ آدمی ہے جو اپنے چھوٹے سے باغ سے پھول اُگا کر بیچتا ہے۔ وہ سب کا خیال کرتا ہے اور ہر ایک سے محبت رکھتا ہے۔ دوسری طرف ملر ایک خود غرض اور چالاک شخص ہے۔ وہ ہمیشہ دوستی پر لمبی لمبی تقریریں کرتا ہے اور کہتا ہے کہ وہ ہانس کا سب سے بڑا دوست ہے، مگر حقیقت میں وہ صرف اپنے فائدے کے لیے ہانس کا استعمال کرتا ہے۔

سرديوں ميں جب بانس بھوکا اور پريشان ہوتا ہے، ملر کبھی اس کی مدد نہيں کرتا اور کہتا ہے کہ سچے دوست مشکل وقت ميں تنگ نہيں کرتے۔ ليکن بہار آتے ہی وہ بانس کے باغ سے پھول، سبزياں اور پھل لے جاتا ہے۔ وہ بانس کو بار بار يقين دلاتا ہے کہ وہ اسے پرانا ريڑھا (wheelbarrow) دے گا۔ مگر اس کے بدلے ميں وہ بانس سے اپنے سارے کام کرواتا ہے جيسے آٹے کی بورياں اٹھوانا، بھيڑيں چراوانا، لکڑياں لانے بھيجنا اور کھيتوں کی مرمت کروانا۔ بانس سيدھا سادہ ہونے کی وجہ سے ہميشہ خوشی سے کام کرتا ہے اور سمجھتا ہے کہ یہ سب دوستی کے ليے ہے۔

ايک دن ملر کا بيٹا سيڑھی سے گر کر زخمی ہو جاتا ہے۔ طوفانی رات ميں ملر خود ڈاکٹر کے پاس نہيں جاتا بلکہ بانس کو بھيجتا ہے۔ بانس کہتا ہے کہ اسے اندھيرے ميں روشنی کے ليے لالٹين دے ديں، مگر ملر انکار کر ديتا ہے۔ بانس پھر بھی بہادری سے نکلتا ہے، بارش اور طوفان برداشت کرتا ہے، مگر راستہ بھول کر دلدل ميں گر جاتا ہے اور ڈوب کر مر جاتا ہے۔ اگلے دن لوگوں کو اس کی لاش ملتی ہے اور سب اس کے جنازے ميں شريک ہوتے ہيں۔ ملر سب سے آگے "چيف مَورنر" کے طور پر چلتا ہے اور لوگوں کے سامنے روتا ہے، ليکن دل ميں صرف یہی سوچ رہا ہوتا ہے کہ اب پرانے ريڑھے کا کیا کرے۔

Exercise-01: Pre-Reading Question

1. What is your idea of a true friend?

A true friend is someone who cares, supports, and stays loyal in every situation. He does not use you but helps you in need.

ايک سچا دوست وہ ہوتا ہے جو ہر حال ميں خيال رکھے، مدد کرے اور وفادار رہے۔ وہ دوست کا فائدہ نہيں اٹھاتا بلکہ مشکل وقت ميں ساتھ ديتا ہے۔

2. Write qualities of a true friend. Each quality starts with the following letters.

- F – Faithful
- R – Respectful
- I – Inspiring
- E – Encouraging
- N – Noble
- D – Devoted

This way, "FRIEND" itself shows the qualities of a true friend.

Exercise-02: Work in pairs or groups. Match phrases with their contextual meaning.

Phrases	Contextual Meaning
by himself	all alone

getting on	managing
by-the-bye	incidentally
at once	immediately
took down	write
keep up	continue
as good as	very nearly
at great length	with much detail

Exercise-03

Read the following statements and write the name of names of characters these statements belong to.

No	Statements	Character
1	You are certainly very thoughtful about	The Miller's Wife
2	But could we not ask little Hans up here?	The Miller's Son
3	Friendship never forgets.	The Miller
4	I wouldn't be unfriendly for the whole world.	Little Hans
5	What do you want, little Hans?	The Doctor
6	Little Hans is certainly a great loss to everyone.	The Blacksmith

Exercise-04: Read the statement and choose the correct option.

- Little Hans faced difficulties in the season of _____.
A. spring B. summer C. autumn D. winter
- Miller didn't want to invite Hans at his home during winter because he thought that Hans might _____.
A. steal their things B. over stay C. ask for flour on credit D. become burden

3. Miller's wife was _____.
 A. a very kind lady B. critical of her husband
 C. selfish like husband D. always busy in household chores
4. Hans wanted to sell his primroses to _____.
 A. florist B. Burgomaster's daughter C. Miller's wife D. doctor
5. Miller's wheelbarrow was in _____ condition.
 A. broken B. perfect C. slightly damaged D. unused
6. Miller asked Hans to do all the chores except _____.
 A. carry sack of flour B. gather wood for kitchen fire
 C. graze sheep in the mountain D. mend the roof of barn
7. In a stormy night Miller came to Hans to _____ for injured son.
 A. fetch medicine B. bring doctor C. arrange ambulance D. cook food
8. Hans died because of _____.
 A. his own carelessness B. negligence of doctor
 C. trap of goatherd D. selfishness of Miller
9. Which of these statements is true:
 A. Miller was a really a sincere friend.
 B. Hans was tempted by Miller's wheelbarrow.
 C. Miller exploited Hans for his own selfish motive.
 D. Hans knew the true nature of the Miller.
10. The moral of the story is:
 A. One should sacrifice one's life for friends. B. One sided friendship is damaging.
 C. One should not trust friends. D. One should not promise anything to friends.

KEY

1	D	2	C	3	C	4	B	5	A
---	---	---	---	---	---	---	---	---	---

6	B	7	B	8	D	9	C	10	B
---	---	---	---	---	---	---	---	----	---

Extra MCQs

1. What did the Miller often take from Hans's garden?

- A. Vegetables B. Herbs, flowers, and fruits C. Seeds and tools D. Wood and hay

Answer: B. Herbs, flowers, and fruits

2. What was Hans doing when the Miller first visited him in spring?

- A. Planting roses B. Leaning on his spade C. Fixing his fence D. Carrying water

Answer: B. Leaning on his spade

3. Why did Hans feel happy giving away his flowers to the Miller?

- A. He thought flowers had no value B. He wanted to make the Miller's wife happy
C. He valued the Miller's good opinion more than money

D. He had too many flowers to sell

Answer: C. He valued the Miller's good opinion more than money

4. Who found Hans's body after he drowned?

- A. The Miller's son B. The Doctor C. Some goatherds D. The Blacksmith

Answer: C. Some goatherds

5. What did the Miller complain about after Hans's funeral?

- A. The cost of the funeral B. That Hans had borrowed his tools
C. That the wheelbarrow was now useless to him
D. That no one helped with his mill works

Answer: C. That the wheelbarrow was now useless to him

6. What reason did the Miller give for not lending Hans his lantern?

- A. It was broken B. It was too old
C. It was new and he didn't want it damaged D. It was not working in rain

Answer: C. It was new and he didn't want it damaged

7. Why did Hans agree to do so many tasks for the Miller?

- A. He was paid well B. He feared losing his friendship
C. He was promised the wheelbarrow D. He wanted to learn mill work

Answer: C. He was promised the wheelbarrow

8. 9. What task did the Miller ask Hans to do right after mending the barn roof?

- A. Drive sheep to the mountain B. Fetch water
C. Paint the mill D. Gather wood

Answer: A. Drive sheep to the mountain

9. 10. In which season did the Miller stop visiting Hans?

- A. Summer B. Spring C. Winter D. Autumn

Answer: C. Winter

10. 11. What did Hans often write in his notebook?

- A. His gardening plans B. The Miller's sayings about friendship
C. Expenses and earnings D. Poetry about flowers

Answer: B. The Miller's sayings about friendship

11. 12. Why did Hans not have time to take care of his garden?

- A. He was sick B. The Miller always sent him on errands
C. It rained heavily D. He sold his tools

Answer: B. The Miller always sent him on errands

12. 13. What happened to the Miller's son?

- A. He got sick from cold B. He fell from a ladder
C. He was lost in the forest D. He broke his arm while playing

Answer: B. He fell from a ladder

13. 14. How long did Hans walk to reach the Doctor's house on the stormy night?

- A. One hour B. Two hours C. Three hours D. Four hours

Answer: C. Three hours

Exercise-05: Answer the following question after reading the text

1. How does the friendship between Hans and Miller seem odd from the beginning?

Ans. From the very start, the friendship between Hans and the Miller looks strange because it is not balanced. Hans is a simple, kind man who works hard in his garden and happily gives flowers, fruits, and herbs to the Miller whenever he comes. The Miller, who is rich and owns many things like cows, sheep, and sacks of flour, never gives anything back to Hans. Instead, he always talks about how "true friends should have everything in common," but in reality he only takes from Hans. Even in winter, when Hans is cold and hungry, the Miller does not visit or help him. He says that visiting someone in trouble is not good for friendship, which is clearly just an excuse. The Miller's words sound nice, but his actions are selfish. Hans, being too trusting, believes these speeches and feels lucky to have such a "noble" friend. From the beginning, we can see that the Miller uses

friendship as a way to get things from Hans without giving anything in return, and this makes their friendship unusual and unfair.

2. Why did Hans sell his wheelbarrow?

Hans sold his wheelbarrow because he was facing a very hard winter. In the cold months, he had no flowers or fruits to sell in the market, so he had very little food and money. To survive, he first sold the silver buttons from his Sunday coat, then his silver chain, then his big pipe. At last, when he still needed money to buy bread, he sold his wheelbarrow. Hans planned that when spring came and his garden had flowers again, he would sell them in the market, earn money, and buy back all the things he had sold, including his wheelbarrow. This shows that Hans only sold it out of need, not because he wanted to.

3. In what way does the Miller exploit Hans with the promise of giving him his wheelbarrow?

The Miller uses the promise of giving his broken wheelbarrow to make Hans do many things for him. He keeps reminding Hans about the wheelbarrow whenever he wants help, so Hans feels he should agree. First, the Miller asks for Hans's plank of wood for his barn roof, saying it is a return for the wheelbarrow. Then he asks for a big basket of flowers, which Hans was going to sell. Later, he makes Hans carry a heavy sack of flour to the market, mend his barn roof, and drive his sheep to the mountain. In the end, the wheelbarrow is never actually given, but the promise is used to make Hans work hard and give away his things without payment.

4. What final act of the Miller's selfishness leads to Hans' death?

The final act of the Miller's selfishness happens on a stormy night. The Miller's son gets hurt, and instead of going for the doctor himself, the Miller sends Hans. He says Hans should go because he is going to give him his wheelbarrow. Hans asks for a lantern, but the Miller refuses, saying it is new and he does not want it to get damaged. Hans puts on his warm clothes and walks in the heavy rain and strong wind for hours to reach the doctor. On the way back, the storm becomes worse, and Hans loses his way on the dangerous moor. He falls into a deep hole filled with water and drowns. This selfish act of the Miller, sending Hans in such weather and refusing to help him with even a lantern, leads directly to Hans's death.

5. Hans' own simplicity and trustworthiness also contribute to his death. Do you agree with the statement? Justify your response.

Yes, I agree with the statement. Hans is a very simple and kind man who trusts the Miller completely. He believes every nice-sounding thing the Miller says about friendship and never thinks that his friend could take advantage of him. Even when the Miller keeps asking for work, taking his things, and giving nothing in return, Hans never refuses. On the stormy night, Hans again agrees to go for the doctor, even though the weather is dangerous. He does not insist on taking the lantern when the Miller refuses, and he sets out alone in the dark. His good heart and willingness to please the Miller make him ignore his own safety. This blind trust and innocence, along with the Miller's selfishness, lead to his death.

6. "False friends are worse than open enemies." Discuss this aphorism in the context of the story *The Devoted Friend*.

The saying "False friends are worse than open enemies" means that someone who pretends to be your friend but cheats you is more dangerous than someone who openly shows dislike. In *The Devoted Friend*, the Miller is a false friend to Hans. He speaks sweet words about friendship but uses them only to get work and things from Hans. He never helps Hans in his time of need, and even in winter leaves him cold and hungry. The Miller's fake kindness makes Hans trust him, so Hans keeps helping without realizing he is being used. This false friendship is more harmful than an open enemy because Hans never tries to protect himself from the Miller. In the end, the Miller's selfishness and empty promises cause Hans's death. This shows that a false friend can harm you quietly while pretending to care, which makes them worse than an enemy who shows his real face.

7. How would you deal if you have a friend like the Miller?

If I had a friend like the Miller, I would be careful and not let him take advantage of me. I would listen to his words but also watch his actions to see if he is truly a good friend. If I noticed that he only comes to me when he needs help and never supports me in return, I would politely refuse to do work that harms me or takes too much of my time. I would set clear limits and explain that friendship should be equal, with both giving and receiving. If he still behaved selfishly, I would slowly distance myself from him, because keeping such a false friend would only bring harm and sadness in the end.

Exercise-06: Write any five contrasting characteristics of Hans and Miller.

Hans' Characteristics	Miller's Characteristics
Kind and helpful	Selfish and demanding
Trusting and innocent	Clever and manipulative
Hardworking	Lazy and avoids hard work
Always thinks of others	Only thinks of himself
Keeps his promises	Breaks promises

Vocabulary

Word	Meaning (Easy English)	Urdu Translation	Synonym
merrily	happily, with joy	خوشی سے	joyfully, cheerfully
porch	covered entrance to a house	برآمدہ	veranda, entrance
honeysuckle	a climbing plant with flowers	بیل نما خوشبودار پودا	flowering vine
trudged	walked with effort	تھک کر چلنا	plodded, slogged
milestone	stone showing distance	سنگ میل	landmark, marker
dusty	full of dry dirt	دھول بھرا	dirty, powdery
robbers	thieves who use force	ڈاکو	bandits, burglars
idleness	laziness	سستی	inactivity, sloth
sluggish	slow and inactive	سست	lazy, inactive
timid	shy	شرمیلہ	shy, nervous
ladder	climbing tool	سیڑھی	steps, stairway
delightful	very pleasant	خوشگوار	lovely, enjoyable
privilege	special advantage	اعزاز	honor, benefit
theory	ideas about something	نظریہ	principle, belief

practice	repeated action to learn	مشق	training, exercise
anxious	worried	فکرمند	concerned, uneasy
errands	small jobs outside home	کام کاج	tasks, chores
distressed	very upset	پریشان	troubled, worried
reflection	serious thought	غوروفکر	thought, consideration
note-book	small book for writing	نوٹ بک	journal, pad
wild night	stormy night	طوفانی رات	stormy, rough
terribly	very badly	بری طرح	badly, awfully
compliment	kind or praising words	تعریف	praise, admiration
ditch	long narrow hole in ground	نالی	trench, gutter
courageous	brave	بہادر	bold, fearless
torrents	heavy rain	موسلا دھار بارش	downpour, flood
moor	wild open land	دلدلی زمین	heath, wetland
funeral	ceremony for a dead person	جنازہ	burial, memorial
mourner	person at a funeral	سوگوار	griever, bereaved
procession	people walking in order	جلوس	parade, march
spiced wine	wine with spices	مصالحہ دار شراب	mulled wine
generous	giving to others	سخی	charitable, kind

incidentally	by the way	ویسے تو	by-the-by, casually
as good as	almost	لگ بھگ	nearly, practically
at great length	with much detail	تفصیل سے	in detail, thoroughly
manage	control or do well	سنبھالنا	handle, direct
immediately	right away	فورا	instantly, promptly
credit	borrow with promise to pay later	ادھار	loan, trust
tempted	attracted to do something	لالچ میں آنا	attracted, lured, enticed
selfish	caring only for oneself	خود غرض	self-centered, egotistical, greedy
chores	small daily tasks	گھریلو کام	tasks, duties, jobs
fetch	go and bring something	لانا	bring, collect, retrieve
arrange	plan or prepare	انتظام کرنا	organize, prepare, plan
ambulance	vehicle for sick people	ایمبولینس	emergency vehicle, rescue van, medical transport
negligence	not being careful	لاپرواہی	carelessness, inattention, disregard
trap	trick to catch someone	جال	snare, net, pitfall
sincerity	honesty	خلوص	honesty, truthfulness, genuineness
damaging	causing harm	نقصان دہ	harmful, destructive, injurious

sacrifice	give up for others	قربانی دینا	give up, surrender, forfeit
promise	say you will do something	وعدہ	pledge, vow, assurance
burden	heavy load or responsibility	بوجھ	load, weight, obligation
popular	liked by many people	مقبول	well-liked, admired, famous
credit	trust for payment later	ادھار	loan, trust, belief
cottage	small house	کچا مکان	small house, hut, cabin
cheery	happy and bright	خوش مزاج	happy, bright, cheerful
mended	repaired	مرمت کیا	repaired, fixed, restored
privilege	special chance	اعزاز	honor, advantage, right
advise	give suggestions	مشورہ دینا	recommend, suggest, counsel
compliment	nice words to someone	تعریف	praise, admiration, flattery
journey	trip from one place to another	سفر	trip, travel, voyage
worst	most bad	بدترین	poorest, lowest, most unpleasant
frightened	afraid	خوف زدہ	scared, afraid, terrified
agreed	said yes	متفق	accepted, approved, consented
blame	say it's someone's fault	الزام دینا	accuse, fault, charge

suffer	feel pain	تکلیف اٹھانا	endure, undergo, experience
reward	gift for good work	انعام	prize, gift, benefit
nearly	almost	قریب	almost, about, approximately
praise	say good things about	تعریف کرنا	admire, commend, approve
noble	good and honorable	شریف	honorable, dignified, virtuous
excuse	reason for not doing something	بہانہ	reason, explanation, justification
bargain	deal or agreement	سودے بازی	deal, agreement, negotiation
faith	strong belief	ایمان	trust, belief, confidence
wander	walk without direction	آوارہ پھرنا	roam, stray, drift
float	stay on water surface	تیرنا	drift, bob, hover
discovered	found something	دریافت کیا	found, uncovered, detected
incident	event	واقعہ	event, occurrence, happening
criticise	find fault	تنقید کرنا	blame, disapprove, condemn
plain	simple and clear	سادہ	simple, clear, obvious
imagine	create picture in mind	تصور کرنا	think, picture, visualize
thoughtful	caring and considerate	خیال رکھنے والا	caring, considerate, kind

certainly	surely	یقیناً	surely, definitely, absolutely
considered	thought about	سوچا گیا	thought about, regarded, judged
opinion	what you think	رائے	view, belief, perspective
advice	suggestion for action	نصیحت	guidance, recommendation, suggestion
trouble	problem	مشکل	problem, difficulty, worry
lend	give for some time	ادھار دینا	give temporarily, loan, allow use of
loss	something gone	نقصان	deprivation, damage, misfortune
precious	very valuable	قیمتی	valuable, treasured, beloved
dangerous	not safe	خطرناک	risky, unsafe, hazardous
repair	fix	مرمت کرنا	fix, restore, mend
weak	not strong	کمزور	fragile, feeble, powerless
kindness	being nice	مہربانی	generosity, compassion, goodwill
fairness	treating equally	انصاف	justice, equality, impartiality
greed	strong desire for more	لالچ	selfishness, avarice, desire
loyalty	being faithful	وفاداری	faithfulness, devotion, allegiance
duty	work you must do	فرض	responsibility, obligation, task
honest	telling the truth	ایماندار	truthful, sincere, genuine

comfort	feeling safe and happy	آرام	ease, relief, contentment
starving	very hungry	بھوکا	hungry, famished, starving
master	person in control	مالک	boss, leader, ruler
fortunate	lucky	خوش قسمت	lucky, blessed, favored
pretend	act like something is true	دکھاوا کرنا	act, fake, simulate

uNIT:02 CONTRIBUTION OF WORLD LEADERS

Lesson 02: i HAVE A DREAM BY MARTIN LUTHER KING

Full Translation Video: <https://youtu.be/4pGD3p0z8-4?si=Yma999ssK-Di6L28>

Full Solved Exercise Video: <https://youtu.be/2TJbN2Dd47g?si=uVOFp3Ky9MhDrIzc>

Summary of lesson: (In English)

In 1963, Dr. Martin Luther King Jr. gave his famous speech “*I Have a Dream*” at the Lincoln Memorial in Washington, D.C. A very large crowd came to listen to him. In his speech, he talked about freedom, equality, and justice. He said that even though slavery had ended a hundred years ago, Black people were still not truly free. They were poor, treated unfairly, and forced to live separately from white people.

Dr. King told people that the time had come to end racism and unfair treatment. He said the fight for equality should be done with peace and dignity, not with violence. He explained how segregation hurt people’s respect and dignity, for example when Black children were not allowed in white schools or when signs said “For Whites Only.”

The most famous part of his speech was when he said, *"I have a dream."* He dreamed of a future where people are judged by their character, not their skin colour. He dreamed that Black and white children would play together as brothers and sisters. He wanted freedom and justice to spread across America. His words gave people hope and courage, and his dream became a message of peace, equality, and unity for the whole world.

Summary of lesson: (In Urdu)

1963 میں، ڈاکٹر مارٹن لوتھر کنگ جونیئر نے اپنی مشہور تقریر *"آئی بیو اے ڈریم" (I Have a Dream)* امریکہ کے شہر واشنگٹن ڈی سی کے لنکن میموریل پر کی۔ اس وقت تقریباً ڈھائی لاکھ سے زیادہ لوگ وہاں موجود تھے۔ یہ تقریر تاریخ کی سب سے مشہور تقاریر میں سے ایک سمجھی جاتی ہے۔ اس تقریر میں ڈاکٹر کنگ نے آزادی، انصاف اور برابری کی بات کی۔ انہوں نے بتایا کہ غلامی ختم ہوئے سو سال ہو چکے ہیں، لیکن اس کے باوجود سیاہ فام لوگ آج بھی حقیقی آزادی سے محروم ہیں۔ وہ غربت میں زندگی گزار رہے ہیں، انہیں نسل پرستی اور ناانصافی کا سامنا ہے، اور انہیں گورے لوگوں سے الگ رکھا جا رہا ہے۔

ڈاکٹر کنگ نے کہا کہ اب وقت آگیا ہے کہ نسل پرستی اور امتیازی سلوک کو ختم کیا جائے۔ انہوں نے لوگوں کو پر امن جدوجہد کی تلقین کی۔ ان کا کہنا تھا کہ جدوجہد عزت اور وقار کے ساتھ ہونی چاہیے، نہ کہ تشدد کے ذریعے۔ انہوں نے بتایا کہ علیحدگی (Segregation) نے سیاہ فام لوگوں کی عزت اور خودداری کو چھین لیا ہے۔ مثال کے طور پر، کالے بچے گورے بچوں کے ساتھ اسکول نہیں جا سکتے تھے اور جگہ جگہ بورڈ لگے ہوتے تھے جن پر لکھا ہوتا تھا "صرف گوروں کے لیے"۔ یہ سب چیزیں ان کے دل کو توڑتی تھیں اور ان کی زندگی کو مشکل بناتی تھیں۔

اس تقریر کا سب سے مشہور حصہ وہ ہے جب انہوں نے بار بار کہا: *"آئی بیو اے ڈریم"* یعنی "میرا ایک خواب ہے"۔ انہوں نے اپنے خواب کی تصویر کھینچی کہ ایک دن ایسا وقت آئے گا جب لوگوں کو ان کی رنگت سے نہیں بلکہ ان کے کردار سے پرکھا جائے گا۔ ان کا خواب تھا کہ کالے اور گورے بچے ایک ساتھ کھیلیں گے اور ایک دوسرے کو بہن بھائی سمجھیں گے۔ وہ چاہتے تھے کہ انصاف اور آزادی پورے امریکہ میں ہر جگہ پہنچے۔

ڈاکٹر مارٹن لوتھر کنگ کی تقریر نے لاکھوں لوگوں کے دلوں کو بدل دیا۔ ان کے الفاظ نے امید اور حوصلہ دیا۔ ان کا خواب صرف امریکہ کے لیے نہیں بلکہ پوری دنیا کے لیے ایک پیغام بن گیا۔ یہ پیغام امن، بھائی چارے، برابری اور انصاف کا تھا۔ آج بھی ان کی تقریر کو یاد کیا جاتا ہے اور یہ آزادی اور مساوات کی علامت سمجھی جاتی ہے۔

Speech in urdu

میں آج آپ کے ساتھ شامل ہو کر خوش ہوں۔ یہ دن ہماری قوم کی آزادی کے لیے سب سے بڑی جدوجہد کے طور پر یاد رکھا جائے گا۔ یہ فیصلہ لاکھوں غلاموں کے لیے امید کی روشنی کی طرح آیا، لیکن ایک صدی گزرنے کے بعد بھی سیاہ فام لوگ غلامی کی زنجیروں میں جکڑے ہوئے ہیں۔ وہ غربت کے جزیرے پر زندہ ہیں، جبکہ ان کے اردگرد خوشحالی کا سمندر ہے۔ وہ اب بھی امتیازی سلوک اور علیحدگی کا شکار ہیں۔ اسی لیے ہم آج یہاں جمع ہوئے ہیں تاکہ اس شرمناک حقیقت کو دنیا کے سامنے لایا جا سکے۔

ہمیں اب وقت ضائع نہیں کرنا چاہیے۔ اب وقت ہے کہ ہم جمہوریت کے وعدے کو سچ کریں۔ اب وقت ہے کہ ہم نسل پرستی کے اندھیرے سے نکل کر انصاف کی روشنی کی طرف بڑھیں۔ اب وقت ہے کہ ہم اپنے ملک کو ناانصافی کی دلدل سے نکال کر بھائی چارے کی مضبوط چٹان پر کھڑا کریں۔ ہمیں اپنی جدوجہد کو وقار اور نظم و ضبط کے ساتھ جاری رکھنا ہے۔ ہمیں کبھی تشدد کا راستہ نہیں اپنانا۔ ہمیں بار بار نفرت کے جواب میں محبت اور امن کے ساتھ کھڑا ہونا ہے۔

ہم اس وقت تک مطمئن نہیں ہو سکتے جب تک ہمارے بچے "صرف گوروں کے لیے" کے بورڈ دیکھ کر اپنی عزت نہ کھو بیٹھیں۔ ہم اس وقت تک مطمئن نہیں ہو سکتے جب تک ایک ریاست میں سیاہ فام ووٹ نہ دے سکے اور دوسری ریاست میں اسے ووٹ دینے کی امید ہی نہ ہو۔ نہیں، ہم مطمئن نہیں ہو سکتے جب تک انصاف پانی کی طرح نہ بہے اور نیکی ایک طاقتور دریا کی طرح نہ پھیل جائے۔

آج میں آپ کو کہتا ہوں، میرے دوستو، میرے پاس ایک خواب ہے۔ یہ خواب امریکہ کے خواب میں جڑا ہوا ہے۔ میرا خواب ہے کہ ایک دن یہ ملک اٹھے گا اور اپنے عہد کو پورا کرے گا کہ سب انسان برابر ہیں۔ میرا خواب ہے کہ ایک دن غلاموں کے بیٹے اور آقاؤں کے بیٹے ایک ہی بھائی چارے کی میز پر بیٹھیں گے۔ میرا خواب ہے کہ ایک دن مسیسیپی جیسی ریاست، جو ظلم اور جبر کی گرمی سے جل رہی ہے، آزادی اور انصاف کی وادی بن جائے گی۔

میرا خواب ہے کہ میرے چار بچے ایسے ملک میں رہیں گے جہاں ان کا فیصلہ ان کی جلد کے رنگ سے نہیں بلکہ ان کے کردار سے ہوگا۔ میرا خواب ہے کہ ایک دن چھوٹے کالے بچے اور چھوٹے گورے بچے ایک دوسرے کے ہاتھ پکڑ کر بہن بھائی کی طرح رہیں گے۔ میرا خواب ہے کہ ایک دن ہر پہاڑ نیچا ہوگا، ہر وادی بلند ہوگی، اور انصاف ہر جگہ ظاہر ہوگا۔ یہی ہمارا ایمان ہے اور یہی امید ہے جس کے ساتھ ہم واپس جائیں گے۔

اسی ایمان کے ساتھ ہم مشکلات کو آسان بنا لیں گے۔ اسی ایمان کے ساتھ ہم اپنے اختلافات کو بھائی چارے کی ایک خوبصورت دھن میں بدل دیں گے۔ اسی ایمان کے ساتھ ہم ایک ساتھ کام کریں گے، دعا کریں گے، جدوجہد کریں گے، اور آزادی کے لیے کھڑے ہوں گے۔ اور ایک دن ہم سب آزاد ہوں گے۔ اس دن سب لوگ گائیں گے: آزادی کا نغمہ، ہر پہاڑ سے آزادی کی صدا۔ جب یہ آزادی کی آواز پورے ملک میں گونجے گی تو ہم سب مل کر ایک دوسرے کے ہاتھ تھامیں گے اور کہیں گے: آزاد آخر کار! شکر ہے خدایا، ہم آزاد آخر کار!

Exercise-01: Pre-Reading Questions:

1. Do you know any world leader?

Yes, I know about Quaid-e-Azam Muhammad Ali Jinnah. He was a great world leader.

2. Tell the contributions/success/achievement of the leader.

Quaid-e-Azam worked hard for the independence of Pakistan. He gave strong leadership to Muslims of the subcontinent. Because of his struggle, Pakistan came into being in 1947. He is remembered as the founder of our country and a man of honesty and courage.

Exercise-02: Work in pairs and write the meaning of following words.

Word	English Meaning	Synonyms	Urdu Meaning
Segregation	The enforced separation of groups, especially based on race, religion, or gender	Separation, Isolation, Apartheid	نسلی علیحدگی، علیحدگی
Discrimination	Unfair treatment of a person or group based on race, gender, age, or other factors	Prejudice, Bias, Inequality	امتیازی سلوک
Liberty	The state of being free within society from oppressive restrictions	Freedom, Independence, Autonomy	آزادی
Equality	The state of being equal in status, rights, and opportunities	Parity, Fairness, Uniformity	مساوات
Righteousness	The quality of being morally right or justifiable	Virtue, Justice, Morality	راستیازی، نیکی
Oppression	Prolonged cruel or unjust treatment	Tyranny, Persecution, Subjugation	ظلم، جبر

Despair	The complete loss or absence of hope	Hopelessness, Misery, Discouragement	مایوسی
Dignity	The quality of being worthy of honor or respect	Honor, Self-respect, Nobility	وقار، عزت
Exile	Being forced to live away from one's home, often for political reasons	Banishment, Expulsion, Deportation	جلاوطنی
Symphony	A long, complex piece of music for an orchestra; also, a harmonious arrangement of elements	Harmony, Composition, Concord	سمفنی، ہم آہنگی

Exercise-03: Read the statements and choose the correct option.

1. In the speech, Jr. Martin Luther King describes an ideal future for his children as ____.

A. land of wealth B. free from judgment C. no discrimination D. without obstacles

2. _____ is Jr. Martin Luther King's vision in his dream.

A. No economic hardship B. Justice for all C. Self-reliance D. Black dominance

3. Where did Martine Luther King deliver the "I Have a Dream" speech?

A. The White House B. Lincoln Memorial
C. United Nations Headquarters D. Martin Luther King Jr. Museum

4. When was the "I Have a Dream" speech delivered?

A. July 4, 1962 B. January 15, 1960 C. August 28, 1963 D. December 25, 196

5. The phrase "Let freedom ring" symbolizes_____.

A. political unity B. equality for all C. military success D. religious faith

6. What is King's stance on violence?

A. Encourages it B. Supports protests C. Rejects violence D. Accepts retaliation

7. What does "table of brotherhood" mean?

A. Economic equality B. Social harmony C. Political rivalry D. Government rule

8. What is the overall tone of the speech?

A. Hopeless and bitter

B. Angry and violent

C. Hopeful and determined

D. Casual and humorous

9. The main theme of the speech is _____.

A. celebration of black culture

B. demand for racial equality and justice

C. praise for American politics

D. call for war against discrimination

KEY

#	Correct Answer	#	Correct Answer
1	B. free from judgment	6	C. Rejects violence
2	B. Justice for all	7	B. Social harmony
3	B. Lincoln Memorial	8	C. Hopeful and determined
4	C. August 28, 1963	9	B. demand for racial equality and justice
5	B. equality for all		

Exercise-04: Read the statements and choose the correct option.

1. How does Martin Luther King describe the current conditions of African Americans, despite the promises made a century earlier?

Martin Luther King Jr. says that even after one hundred years, African Americans still live in hard and unfair conditions. A long time ago, there was a promise that all people, including Black people, would have the same rights. These rights include life, freedom, and the chance to be happy. But African Americans are still poor and treated badly. They live separated from white people because of laws and rules called segregation. Many Black

people cannot vote or take part in decisions. Signs say "For Whites only," which hurts their respect and feelings. This shows that the promise of equality and freedom is not true yet. Martin Luther King Jr. wants to change this and hopes for justice and fairness for everyone.

2. What does Martin Luther King mean when he says, "Now is the time to rise from the dark and desolate valley of segregation to the sunlit path of racial justice"?

When Martin Luther King Jr. says, "Now is the time to rise from the dark and desolate valley of segregation to the sunlit path of racial justice," he means it is time to leave behind the bad and unfair treatment of Black people. The "dark and desolate valley" means a sad and lonely place where Black people are separated and treated unfairly. The "sunlit path" means a bright and happy way where everyone is treated equally and fairly. King is saying that now is the right time to stop separation and work for fairness and justice for all people.

3. Why does Martin Luther King emphasize that the struggle for equality must be conducted with dignity and discipline?

Martin Luther King Jr. says the fight for equality must be done with dignity and discipline because it should be peaceful and respectful. He wants people to be proud and strong without using violence or fighting back with anger. If the struggle turns violent, it will cause more problems and people might not support their cause. King believes that showing good behavior and self-control will make their message stronger. By using peaceful ways, they can win justice and fairness for everyone.

4. How does the phrase "justice rolls down like waters" deepen the emotional impact of the speech?

The phrase "justice rolls down like waters" makes the speech more powerful because it gives a strong picture in the mind. It shows justice as something big, strong, and never-ending, like a river. Water can clean the dirt, and justice can clean unfairness. It also means that justice should come to everyone, just like water flows to every place. This picture makes people feel hope and believe that fairness will come one day.

5. What message does Martin Luther King convey to his listeners through his speech?

Martin Luther King Jr. gives a strong message of hope and fairness in his speech. He tells people to keep fighting for equal rights without using violence. He wants everyone to be treated the same, no matter their skin color. King asks people to come together as brothers and sisters, to live in peace and justice. He believes that one day, all people will be free and equal, and no one will face unfairness because of race. His message encourages people to believe in a better future and to keep working for freedom and equality.

6. What role does hope play in Martin Luther King's speech, and how does it influence the audience's response?

Hope plays a very important role in Martin Luther King Jr.'s speech. He talks about a bright future where everyone is treated fairly and lives together in peace. This hope gives people strength and courage to keep fighting for their rights. It helps them believe that change is possible, even when things are difficult. Because of this hope, the audience feels inspired and motivated. They feel that their dreams for justice and equality can really come true if they work together and never give up.

7. How does Martin Luther King use contrast between past injustices and future hopes to strengthen his argument?

Martin Luther King Jr. talks about the bad things that happened to Black people in the past. He describes how they faced unfair treatment, poverty, and segregation. Then, he talks about his dream for a better future, where everyone is equal and free. By showing the difference between the sad past and the hopeful future, King makes his message stronger. This contrast helps people see why change is needed and makes them feel excited about the possibility of a fair and peaceful future.

Exercise:05: Read the statements on Martin Luther King's Speech in Column 'A' and write 'true' or 'false' in Column 'B'.

Column A	Column B
1. Martin Luther King delivered this speech in Washington, D.C.	True
2. The speech argues for the superiority of one race over another.	False
3. Martin Luther King compares injustice to "sweltering heat."	True
4. The phrase "I have a dream" is used one time in the speech.	False
5. The speech emphasizes the importance of peaceful protest.	True
6. Martin Luther King says that segregation has already been abolished.	False
7. "Let freedom ring" is repeated several times in the speech.	True
8. Martin Luther King states that racial justice will happen naturally without action.	False
9. The speech refers to the U.S. Declaration of Independence.	True
10. Martin Luther King encourages violence as a means to achieve justice.	False

Word	English Meaning	Synonyms	Urdu Meaning
Decree	An official order issued by a legal authority	Order, Command, Mandate	فرمان، حکم
Beacon	A guiding light or signal	Signal, Guide, Light	مشعل، رہنما روشنی
Withering	Causing to fade or lose strength	Fading, Weakening, Diminishing	مرجھانا، کمزور کرنا
Injustice	Lack of fairness or justice	Wrongdoing, Inequity, Unfairness	ناانصافی
Captivity	The condition of being imprisoned or confined	Imprisonment, Enslavement, Confinement	قید، اسیری
Manacles	Metal bands or chains for fastening someone's hands or ankles	Handcuffs, Shackles, Fetters	ہتھکڑی، بیڑیاں
Segregation	The enforced separation of groups, especially by race	Separation, Apartheid, Isolation	نسلی علیحدگی
Discrimination	Unjust treatment based on category like race or gender	Prejudice, Bias, Inequality	امتیازی سلوک
Languished	To lose vitality; to remain neglected	Weakened, Declined, Deteriorated	زوال پذیر ہونا، کمزور ہونا
Dramatize	To present in a vivid or striking way	Exaggerate, Emphasize, Illustrate	ڈرامائی انداز میں پیش کرنا
Unalienable	Unable to be taken away	Inherent, Natural, Absolute	ناقابلِ انتقال
Desolate	Empty, without life	Barren, Lonely, Deserted	سنسان، ویران

Brotherhood	A feeling of unity among people	Fellowship, Solidarity, Kinship	بھائی چارہ
Exile	Being forced to live away from home	Banishment, Deportation, Expulsion	جلاوطنی
Militancy	Aggressiveness in support of a cause	Activism, Radicalism, Extremism	شدت پسندی
Inextricably	In a way that cannot be separated	Indivisibly, Unavoidably, Inevitably	ناقابلِ علیحدگی
Mobility	Ability to move freely	Movement, Motion, Travel	نقل و حرکت
Stripped	Removed or taken away	Deprived, Robbed, Divested	محروم کرنا
Dignity	State of being worthy of respect	Honor, Self-respect, Nobility	وقار
Oppression	Cruel or unfair treatment	Tyranny, Persecution, Subjugation	ظلم، جبر
Oasis	A place of relief in a difficult situation	Refuge, Haven, Sanctuary	نخلستان، پناہ گاہ
Creed	A set of beliefs	Doctrine, Faith, Ideology	عقیدہ، ایمان
Vicious	Intentionally cruel or violent	Brutal, Savage, Malicious	سفاک، ظالم
Nullification	Making something legally invalid	Cancellation, Abolition, Invalidation	منسوخی
Exalted	Raised to a high level	Elevated, Honored, Glorified	بلند مرتبہ
Hew	To cut or shape something	Chop, Carve, Shape	تراشنا، کاٹنا

Despair	Complete loss of hope	Hopelessness, Misery, Discouragement	مایوسی
Discords	Disagreements or conflicts	Disputes, Clashes, Strife	اختلافات
Symphony	A harmonious combination	Harmony, Composition, Orchestra	سمفنی، ہم آہنگی
Prodigious	Remarkably great in size or degree	Enormous, Massive, Tremendous	عظیم، غیر معمولی
Curvaceous	Having attractive curves	Rounded, Shapely, Contoured	خم دار، دلکش
Spiritual	Relating to the soul	Sacred, Divine, Mystical	روحانی

uNIT:03 Managing Stress, Anger & People

Lesson 03: conquest of happiness by burtrand russel

Full Translation Video: <https://youtu.be/Y90I18BJZls?si=Un6wjV5NEfKBYtun>

Full Solved Exercise Video: <https://youtu.be/HIK8kmoOChQ?si=Y9yWKN91EpjOdW3y>

Summary of lesson: (In English)

This lesson tells us about the real meaning of happiness. Happiness does not depend only on money, fame, or comfort. It comes mainly from our thoughts, our attitude, and the kind of work we do. People feel happy when they use their skills, do creative work, and make something useful. Constructive work gives more joy than destructive work.

The author also says hobbies play an important role. Simple hobbies like reading, gardening, or collecting stamps can bring peace and refresh the mind. Happiness also comes from friendly interest in people. When we like and support others without controlling them, we spread joy and receive kindness in return.

Finally, the lesson teaches that we should also take interest in impersonal things like history, science, or nature. Such interests help us forget our worries and give balance to life. The secret of happiness is to keep our interests wide and to respond to people and things in a friendly way.

Summary of lesson: (In Urdu)

یہ سبق ہمیں خوشی کے اصل معنی سمجھاتا ہے۔ خوشی صرف دولت، شہرت یا آرام سے نہیں آتی۔ خوشی زیادہ تر ہمارے خیالات، ہمارے رویے اور ہمارے کام پر منحصر ہے۔ انسان تب خوش ہوتا ہے جب وہ اپنی صلاحیتیں استعمال کرتا ہے، تخلیقی کام کرتا ہے اور کچھ ایسا بناتا ہے جو فائدہ مند ہو۔ تخلیقی اور تعمیری کام ہمیشہ توڑ پھوڑ یا منفی کام سے زیادہ سکون اور خوشی دیتا ہے۔

مصنف یہ بھی بتاتا ہے کہ مشغلوں (ہوبیز) کی زندگی میں بڑی اہمیت ہے۔ سادہ مشغلے جیسے کتاب پڑھنا، باغبانی کرنا یا ڈاک ٹکٹ جمع کرنا انسان کو سکون دیتے ہیں اور دماغ کو تازہ کرتے ہیں۔ خوشی کا ایک اور ذریعہ دوسروں کے ساتھ دوستانہ رویہ رکھنا ہے۔ جب ہم دوسروں کو پسند کرتے ہیں، ان کی مدد کرتے ہیں اور ان پر قابو پانے کی کوشش نہیں کرتے تو ہم نہ صرف دوسروں کو خوش کرتے ہیں بلکہ خود بھی خوش رہتے ہیں۔

آخر میں سبق یہ سکھاتا ہے کہ غیر ذاتی چیزوں میں دلچسپی لینا بھی ضروری ہے، جیسے تاریخ، سائنس یا فطرت۔ ان چیزوں میں دلچسپی لینے سے انسان اپنی فکروں کو بھول جاتا ہے اور ذہنی سکون حاصل کرتا ہے۔ زندگی میں خوشی کا راز یہ ہے کہ ہماری دلچسپیاں وسیع ہوں اور ہم لوگوں اور چیزوں کے ساتھ دوستانہ اور مثبت رویہ اختیار کریں۔

Exercise-01: Pre-Reading Questions:

Discuss the following quotes in pairs and answer the following questions:

Q1: What is the common theme of these quotations?

The common theme is that real happiness does not depend on money or outside things. Happiness comes from inside us — from our thoughts, our actions, and the joy of creating or achieving something meaningful.

Q2: What is your idea of happiness?

My idea of happiness is to live with peace of mind, good health, and positive thoughts. Happiness for me is enjoying simple things like spending time with family, doing work I

like, and helping others. It is not about being rich, but about being satisfied with what I have and trying to improve myself every day.

Exercise-02: Work in pairs and write the meaning of following words.

Word	Meaning (English)	Synonyms	Urdu Meaning
Distinguished	Successful and commanding respect; famous for excellence	Renowned, eminent, notable	ممتاز، معروف
Content	In a state of peaceful happiness or satisfaction	Satisfied, pleased, fulfilled	مطمئن، خوش
Blight	A plant disease that causes damage or a thing that spoils	Disease, decay, ruin	زوال، تباہی، بیماری
Flint	A hard type of rock often used to produce sparks or tools	Stone, rock, chert	فلینٹ (چمکدار پتھر)
Craving	A strong desire or longing	Desire, longing, yearning	شدید خواہش، طلب
Inanimate	Not alive; lacking life or spirit	Lifeless, inert, dead	بے جان، غیر جاندار
Obscure	Not well known; unclear or hidden	Unknown, unclear, hidden	کم معروف، غیر واضح
Fascination	The power to attract and hold attention	Captivation, enchantment, allure	دلکشی، کشش
Fads	Trends or fashions that are popular for a short time	Trends, crazes, crazes	وقتی رواج، فیشن، رجحان

Exercise-03: Read the following statements and choose the correct option.

1. According to the passage, many scientists are among the happiest people because___.

A. they are paid more than others

B. their work is recognized by everyone

C. they find deep satisfaction in meaningful work

D. they avoid interaction with the public

2. The main reason the man who wrote about rose blight was happy because he

A. became famous worldwide

B. was admired for his artistic skills

C. found meaning in practicing his specialized skill
D. recovered from his disability

3. What does the passage suggest about recognition and fame in relation to happiness?

A. They are essential for happiness B. They should be ignored completely

C. They help only in artistic careers D. Happiness can exist without them

4. The quality in work that contributes more to happiness than skill alone is

_____.

A. routine

B. flexibility

C.

constructiveness

D. difficulty

5. _____ is likely to cure the habit of hatred.

A. Loveliness

B. Constructive work

C. Amusement

D. Idleness

6. Common mistake adults make about hobbies is _____.

A. thinking hobbies are only for the wealthy
B. believing hobbies should lead to careers

C. assuming hobbies are childish and beneath adulthood

D. spending too much time on hobbies

7. _____ leads to happiness, according to the text.

A. Possessive and intense affection B. Friendly and supportive interest in others

C. Cold and distant admiration

D. Competitive and goal-driven affection

8. An archaeologist takes interest in _____.

A. rocks

B. ruins

C. buildings

D. earth

9. Interest in people and interest in things are _____.

A. analogous

B. opposite

C. different

D. unrelated

10. What is the benefit of developing an interest in impersonal things like history or astronomy?

- A. It guarantees success in life**
- B. It provides permanent happiness**
- C. It offers a break from worries and brings balance**
- D. It distracts from social responsibilities**

1	2	3	4	5	6	7	8	9	10
C	C	D	C	B	C	B	B	A	C

Exercise-04: Each of the following statements conveys central idea in each paragraph of the text. Read the statement and write the number of the paragraph it belongs to. The first one has been done for you as an example.

No.	Statements	Paragraph No.
1	A friendly interest in persons is source of happiness.	
2	The secret of happiness is wide interest and friendly reactions.	
3	One who has some specialised skill can find the pleasure of work.	
4	Constructiveness is more enjoyable than destructiveness.	
5	Hobbies also bring happiness.	
6	Interest in impersonal things can also be pleasurable.	
7	Scientists are the happiest among educated people.	

Exercise 05: Answer the following questions after reading the text.

1. According to the author, why do scientists often experience deep satisfaction in their work?

Scientists feel very happy and satisfied with their work because their job uses all their skills and talents. They work on things that are important for them and also useful for other people. In today's world, science is always growing and improving, and it has a big effect on society. People respect science and scientists, even if they do not fully understand what scientists are doing. This respect and value make scientists feel proud.

Also, many scientists love their work so much that they enjoy almost everything in life. Their work gives them a reason to keep going and keeps their mind busy in a good way. They get happiness not only from the results but also from the process of working, learning, and discovering new things. Because of this, scientists often live a happy and satisfied life.

2. How does the element of constructiveness bring happiness in the work?

Constructiveness means doing work that builds or creates something useful. The author says this gives more happiness than only using a skill because the result stays even after the work is done, giving pride and meaning. Building things brings a deep and peaceful joy, while destroying only gives a short and empty feeling. Constructive work also keeps leading to new achievements, which makes life more interesting. It can even remove hatred from the heart, as creating something good changes the mind in a positive way. This is why constructiveness brings real and lasting happiness in work.

3. What role do hobbies play in the author's broader view of a happy life? What is your own hobby?

According to the author, hobbies are an important part of a happy life because they give relaxation, joy, and a break from serious work. A hobby can be anything you enjoy doing, like gardening, cooking, music, or collecting something. It helps refresh the mind, especially when a person is stuck or tired from their main work. The author also says many adults wrongly think hobbies are only for children or not important, but this is a mistake. Any harmless hobby can add value to life, even if it is not a source of fame or money. Hobbies may not always give deep, permanent happiness, but they give comfort, peace, and temporary joy, which are also important for overall happiness.

My own hobby is reading books. I enjoy reading because it helps me learn new ideas, relax my mind, and travel into different worlds without leaving my place. Sometimes, after a busy or stressful day, reading gives me comfort and makes me feel fresh again. It also improves my knowledge and keeps me curious about new things

4. If you were to apply the author's ideas to your own life, what changes would you consider making in your daily routine or mind-set?

If I follow the author's ideas in my life, I will try to have more interests and be friendly with people and things around me. I will give more time to work that is useful and creates something good, so that my efforts have a positive result. I will also spend some time on my hobbies, because they can relax my mind and make life more balanced.

In my daily routine, I will try to talk to people kindly and not control them or expect too much. I will also take interest in things like history, nature, or science, so I can forget my worries for some time and feel fresh again. Most of all, I will focus on building and improving — whether it is my knowledge, relationships, or skills — because making something good gives real and lasting happiness.

5. What kind of interest in persons causes happiness and what causes unhappiness? The author says that the interest in people which brings happiness is kind and friendly. It means liking people for who they are, enjoying their good qualities, and supporting them without trying to control them or expecting too much back. This attitude makes others happy and they also treat you kindly, which makes you feel good too. The interest that brings unhappiness is when a person is possessive or controlling. This happens when someone always wants attention, tries to control others, or expects too much from them. This usually leads to problems and sadness.

6. Why interest in impersonal things is necessary for the happiness of human beings? The author says that interest in impersonal things, like history, rocks, astronomy, or ancient ruins, is important for happiness because it helps a person forget their personal worries for some time. When someone spends time learning or exploring such things, they feel calm and balanced. This break from problems makes it easier to handle them later. Even though interest in people is more important for daily happiness, interest in impersonal things also gives joy and peace. It refreshes the mind and adds variety to life, which makes a person's overall happiness stronger

7. In your opinion, is happiness more dependent on internal attitude or external circumstances? Explain. I think happiness mostly depends on our own internal attitude, not on outside or external conditions. This is because two people can be in the same situation, but one feels happy and the other feels sad. If we have a positive and friendly way of thinking, we can enjoy small things in life. But if we have a negative way of thinking, even good situations will not make us happy. Things like money, job, or a nice home can give comfort, but they do not give long-lasting happiness. Real happiness comes when we enjoy our work, have good relations with people, and take interest in the world around us. A good attitude also helps us face problems calmly and find meaning in life, which keeps us happy in most situations.

Vocabulary

Word	Meaning (English)	Synonyms	Urdu Meaning
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Distinguished	Successful and commanding respect	Renowned, eminent, notable	ممتاز، معروف
Satisfaction	Pleasure from achieving or fulfilling	Contentment, fulfillment, gratification	اطمینان، تسکین
Significance	Importance or meaning	Importance, meaning, consequence	اہمیت، معنی
Specialized	Focusing on a particular area	Expert, specific, focused	مخصوص، ماہر
Authority	Expert knowledge or control	Expert, specialist, master	اختیار، ماہر
Constructiveness	Quality of being helpful or productive	Positivity, productivity, helpfulness	تعمیریت، تعمیراتی
Achievement	Successful completion of a task	Accomplishment, success, attainment	کامیابی، حصول
Consume	Use up or be absorbed	Absorb, engross, occupy	استعمال کرنا، مشغول ہونا
Dedication	Commitment to a task or purpose	Devotion, commitment, loyalty	وابستگی، لگن
Comfort	Physical ease or relief	Ease, relief, consolation	سکون، آرام
Fascination	Power to attract attention	Captivation, enchantment, allure	دلکشی، کشش
Sophisticated	Experienced and worldly	Cultured, refined, worldly	مہذب، پیچیدہ
Harmless	Not likely to cause harm	Innocuous, safe, benign	بے ضرر، نقصان دہ نہیں
Attachment	Feeling of affection or connection	Bond, affection, connection	وابستگی، محبت

Possessive	Wanting to control or own	Controlling, jealous, dominating	حسد کرنے والا، قابو پانے والا
Admiration	Respect and warm approval	Appreciation, esteem, regard	تعریف، تحسین
Content	Peaceful happiness	Satisfied, pleased, fulfilled	مطمئن، خوش
Companions	People accompanying someone	Friends, partners, associates	ساتھی، ہمراہ
Impersonal	Not influenced by personal feelings	Objective, detached, neutral	غیر ذاتی، بے جان
Sincere	Genuine and honest	Genuine, honest, heartfelt	مخلص، خالص
Calm	Peaceful and free from stress	Tranquil, serene, peaceful	پرسکون، مطمئن
Balance	Equal or correct amounts	Stability, equilibrium, harmony	توازن، اعتدال
Broad	Wide in range or scope	Wide, extensive, comprehensive	وسیع، جامع
Respond	To reply or react	Reply, react, answer	جواب دینا، رد عمل ظاہر کرنا
Hostile	Unfriendly or antagonistic	Aggressive, unfriendly, antagonistic	دشمنی والا، مخالف
Obscure	Not well known or unclear	Unknown, hidden, unclear	کم معروف، غیر واضح
Influence	Power to affect or change	Impact, effect, authority	اثر، نفوذ
Recognition	Acceptance or acknowledgment	Acknowledgment, appreciation, credit	شناخت، تسلیم

Fulfill	To complete or satisfy	Accomplish, achieve, satisfy	پورا کرنا، مکمل کرنا
Passionate	Having strong feelings or enthusiasm	Enthusiastic, fervent, ardent	پر جوش، جذباتی
Craving	A strong desire	Desire, longing, yearning	شدید خواہش، طلب
Overcome	To succeed in dealing with	Conquer, defeat, prevail	قابو پانا، شکست دینا
Meaningful	Having purpose or importance	Significant, important, relevant	بامعنی، اہم
Temporary	Lasting for a short time	Short-term, brief, momentary	عارضی، وقتی
Affection	A feeling of liking and caring	Fondness, love, warmth	محبت، الفت
Enthusiasm	Intense and eager enjoyment	Excitement, passion, zeal	جوش، ولولہ

uNIT:04 Self-discipline

Lesson 04: icarus and daedalus by josephine preston peabody

Full Translation Video: https://youtu.be/tvc_CeCKYLY?si=-kN9zraYwC58y1ew

Full Solved Exercise Video: https://youtu.be/wAw3_wzxATk?si=EIngj3qm0HYWn4dI

Summary of Lesson : (In English)

Daedalus was a very clever and skilled man. He built the Labyrinth for King Minos of Crete. But later, the king became angry and put Daedalus and his son Icarus in prison. Daedalus wanted freedom. He saw the birds flying and thought of a plan. He collected feathers and joined them with wax. In this way, he made wings for himself and Icarus.

Daedalus tested the wings and taught Icarus how to fly. He gave him a warning. He said, "Do not fly too high because the sun will melt the wax. Do not fly too low because the sea will make the feathers heavy." But Icarus was very excited. He wanted to fly higher and higher. He forgot his father's words. When he went too near the sun, the wax melted, the feathers came off/dropped, and he fell into the sea. He died in the water.

Daedalus was full of sorrow. He searched for his son but found only feathers on the sea. In memory of his son, he named a nearby island Icaria. Later, he went to Sicily and gave his wings to the temple of Apollo. He never flew again. The story teaches us to listen to advice, control our desires, and remember that humans have limits.

Summary of lesson: (In Urdu)

ڈیڈلس ایک بہت ہوشیار اور ماہر آدمی تھا۔ وہ بادشاہ منوس آف کریٹ کے لیے ایک بہت بڑی بھول بھلیاں (Labyrinth) بناتا ہے۔ یہ بھول بھلیاں اتنی پیچیدہ اور گھماؤدار تھی کہ جو بھی اندر جاتا، بغیر سراغ کے باہر نہیں نکل سکتا تھا۔ شروع میں بادشاہ اس سے خوش تھا، لیکن وقت کے ساتھ اس نے ڈیڈلس پر اعتماد کھونا شروع کر دیا۔ اس نے ڈیڈلس اور اس کے بیٹے آئیکارس کو قید کر دیا۔

قید میں رہتے ہوئے ڈیڈلس آزادی کے

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